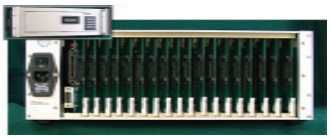
CYTEC SWITCHING SYSTEMS

FOR

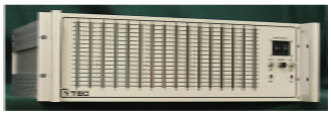
AUTOMATIC TEST, DATA ACQUISITION, COMMUNICATIONS AND CONTROLS

Quality Products
Excellent Service
Reasonable Prices

AUTOMATED TEST AND DATA ACQUISITION



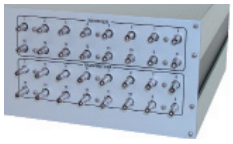
MULTIPLEXERS



MATRIX

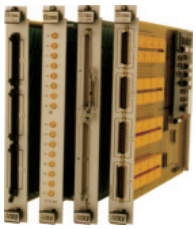
DISCRETE RELAYS

HIGH VOLTAGE OR CURRENT



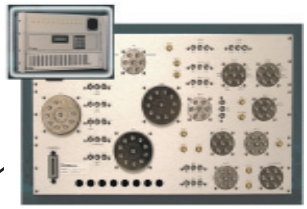
FIBER OPTICS

COMPUTER CONTROLLED FROM ETHERNET LAN, IEEE488 (GPIB), RS232, USB or TTL



VXI, VME, PCI
BUS SWITCH MODULES

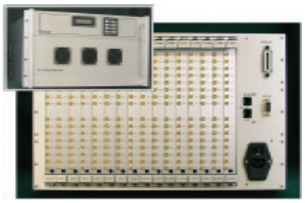
COMMUNICATIONS



MICROWAVE AND RF

LAN, WAN AND TELEPHONY

DIGITAL SERIAL DATA



ANALOG VIDEO AND RF

FOR TECHNICAL ASSISTANCE OR SALES CONTACT
1-800-346-3117 585-381-4740
cytec-ate.com or sales@cytec-ate.com

CYTEC CORP.

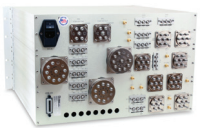
Proudly made in the USA since 1982
2555 Baird Road, Penfield, New York 14526

WEB CATALOG TABLE OF CONTENTS

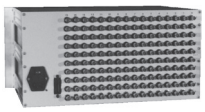
For application guidance you can try our web app:
http://cytec-ate.com/appguide.php

Click on products or links below to get to the right page.

COAXIAL, RF and VIDEO SWITCHING SYSTEMS



CXM SERIES — DC to 40 GHz Microwave and RF Switching Systems. Multiplexers (1xN) and Matrices (NxM), Custom systems.



CXAR SERIES — DC to 1.2 GHz Coax and RF 1xN or 2xN Switching Systems. Mechanical Relay, 50 or 75 ohm. BNC, SMA, F, TNC.

CXB SERIES — Coaxial and RF Switching Matrices -- NxM configurations. DC to 1.2 GHz, mechanical relay. BNC, SMA, N, TNC.

VDX SERIES — 16x16 Solid State Video, RF, IF Matrix. DC to 700 MHz. 50 or 75 ohm. Non-blocking, full fan-out.

VDM SERIES — Modular 8x8 through 32x32 Solid State Video, RF, IF Matrix. DC to 400 MHz. 50 or 75 ohm. Non-blocking, full fan-out.

TX SERIES — Modular 16x16 through 128x128 Solid State Video, RF, IF Matrix. DC to 200 MHz. 50 or 75 ohm. Non-blocking, full fan-out.

DATA SWITCHES -- LAN, WAN, TELCO, DSL

RJ SERIES — RJ45 Systems for Automated test and communications. Physical layer. Mechanical relay. Cable test, device test, patch panels, wiring closets. 10/100/1000BaseT Ethernet, DSL, TELCO, PoE, USB, 232, Firewire.

RS SERIES — D9, D15 or D25 Systems for Automated test and communications. Bidirectional Physical layer relay based. Cable test, device test, patch panels, wiring closets. RS530, RS232, RS485, RS422.

HIGH VOLTAGE - HIPOT SWITCHES

HXV SERIES — High Voltage to 5 KV (25 KV custom). 1xN or 2xN Configurations. Binding post, Banana Jack or SHV connectors. 8 to 8000 switch points.

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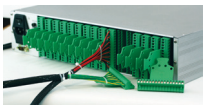
Click on products or links below to get to the right page.

GENERAL PURPOSE AUTOMATED TEST & DATA ACQUISITION



LX SERIES

Versatile test platform w/ LED indicators. 128 switch points.
Matrix, Mux or Discrete relays. Build to suit or off the shelf.
Pico amps to 10 amps, uV to 1500 Volts, DC to 50 MHz.

VX SERIES

Versatile test platform w/ LED indicators. 256 switch points.
Matrix, Mux or Discrete relays. Build to suit or off the shelf.
Pico amps to 10 amps, uV to 1500 Volts, DC to 50 MHz.

JX SERIES

High density multiplexers. 1xN or 2xN configurations.
Reed and armature mechanical relay. Modular.
Pico amps to 10 amps, uV to 1500 Volts, DC to 50 MHz.

HDX SERIES

High density, low cost matrix. 64x32 two wire matrix in one chassis.
Reconfigure as 4, 8, or 16 wire. Bi-directional, non-blocking matrix.

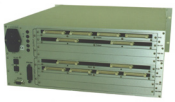
PX SERIES

2 RU Matrix configurations of 32x16 or 64x8. 1 or 2 pole.
DC to 25 MHz. BNC, Header or Screw terminal. Bidirectional.

HIGH SPEED DIGITAL COMMUNICATIONS -- 422, ECL, PECL, LVDS, ETC.

DXM SERIES

16x16 to 128x128 Differential digital signals to 3 Gbps. Solid State.
Modular. Telemetry, satelite, digital communications. Non-blocking,
full fan-out. Can be set up as Clock & Data systems. Low jitter, low
skew. Patch panel to triax, BNC, SMA or other connectors.



DX/256x256 SERIES

Modular 64x64 to 256x256 digital matrix for TTL, 422, PCM signals.
Solid State. Modular. Telemetry, satelite, radar. Non-blocking,
full fan-out. Can be set up as Clock & Data systems.
Patch panel to triax, BNC, SMA or other connectors.

GROUP SWITCHES / GANG SWITCHES

GX SERIES

All Cytec modules can be driven as groups for multi-wire switching.
4 wire coax, environmental test chambers, high wire count cable test
or connector test. Switch 4 to 4000 signals in any configuration.

Continued next page....

Click on products or links below to get to the right page.

FIBER OPTIC SWITCHING SYSTEMS

FO SERIES

Passive fiber optic switches. Single or Multi-mode.
1xN configurations. Any wave length. Build to suit or off the shelf.
ST, LC, SC or other connectors.

FX SERIES

Fiber Optic Switch Matrix. Built according to specs.
OEO Matrix regenerates and fixes signals.
Call or e-mail for details.

MESA CONTROL CHASSIS

MESA 16

3.5" controller runs up to 16 switch chassis from a single GPIB, RS232, or LAN address. Locate switch chassis up to 50' away from controller.

Mesa II

3 RU controller with hot swap redundant control modules, GPIB, RS232 and 10/100 Ethernet LAN. Hot swap EIF cards. Redundant supply options. Allows up to 16 switch chassis controlled from a single point.

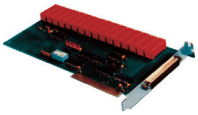
APPLICATION BULLETIN AP-5

Interface application bulletin helps you choose between available control modules:
Ethernet -- GPIB -- RS232 -- USB -- TTL
Which one to use for what application.

WEB LINKS

VXI / VME Bus

C size VXI or B size VME Switch Module Catalog.



ISA/PCI Bus

PC Switch Modules and relay drivers.

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CXM SERIES MICROWAVE
COAXIAL SWITCHING SYSTEMS

The CXM Series Systems are computer controlled, passive bi-directional coaxial switching systems designed to handle 50 ohm RF signals from DC to 18 GHz, and in some cases up to 40 GHz. Two basic topologies are offered: Nx1 multiplexers and NxM nonblocking matrices. RS232 & IEEE488 controls are standard, while Ethernet, USB and front panel Manual Controls are optionally available.

CXM/128 Mainframe

FEATURES:

- **RF systems with bandpass from DC to 18 GHz, 50 ohms impedance, low crosstalk & high isolation.**
- **Some systems with extended bandpass as high as 40 GHz.**
- **Both Nx1 multiplexers and NxM matrices offered. SMA connectors standard, N, BNC, TNC also available.**
- **Computer control via IEEE488 & RS232 standard. Ethernet LAN, USB and front panel Manual Controls optional.**
- **Front Panel LEDs for visual indication of closed switches and remote Status feedback aid in debugging.**
- **Passive design doesn't add to signal noise or create intermodulation products typical of solid state devices.**

CHASSIS:

The **CXM** systems are 19" rack mounted chassis, and are built as either Mainframes or Expansion Chassis. They are designed to hold CXM Series Microwave Switches in configurations specified by the user. All chassis have front panel LEDs showing switch point status. RF connectors are typically mounted on the rear panel.

CXM/16 Chassis - Furnishes 16 relay drives, allowing two 8x1 switch modules, four 4x1 modules or eight 2x1 modules.
CXM/32 Chassis - 32 relay drives allow four 8x1 modules, eight 4x1 modules, thirty-two 2x1s, or a combination.
CXM/64 Chassis - Up to 64 relay drives. Control up to eight 8x1 modules, sixteen 4x1s, sixty-four 2x1s or a combination.
CXM/128 Chassis - Up to 128 relay drives. Control up to sixteen 8x1 modules, thirty-two 4x1s or combinations.
CXM/256 Chassis - Up to 256 relay drives. Typically used to control up to 16 CXM/10x1 Switches.

MICROWAVE SWITCH MODULES:

Several Microwave Switch Module types are offered. Each type has design features tailored to meet specific needs.

CXM/Nx1-NO Series are Normally Open type and are available in sizes ranging from 3x1 to 10x1.
CXM/Nx1-FS Series are Failsafe type. Similar to the NO type, but these modules default to Port 0 closed when powered off.
CXM/Nx1-FT Series terminate unused ports to ground via 50 ohms. Prevents reflections off open ports. 2x1 to 10x1 sizes.
CXM Transfer Switches have four ports that switch to one of two configurations. Configuration A routes Ports 1-3 and 2-4. Configuration B routes Ports 1-2 and 3-4.
Microwave Switches are available with connectors other than SMAs, higher power ratings and frequencies to 40 Gz. Please contact the Factory for more information. We are open to using any brand of relay you prefer.

CONTROL MODULES:

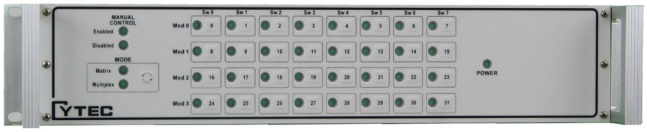
All systems available with IEEE488 (GPIB)& RS232 (standard), Ethernet LAN, USB or TTL Control.

CXM CHASSIS

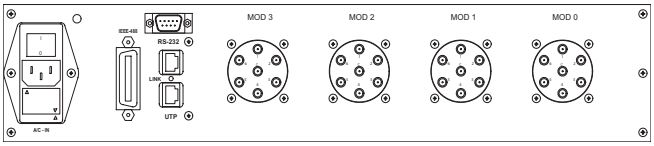
The CXM Series are 19" rack mounting chassis with built in power supplies and are designed to hold the CXM Microwave Switches selected by the user. The switches are typically mounted so that their RF connectors protrude through the rear panel. The front panels have discrete LEDs showing the status of all switch points. The front panels also hold the optional manual controls.

CXM/16 & 32 MAINFRAME or -E EXPANSION CHASSIS

These Chassis furnish either 16 or 32 switch points in user defined configurations. Built-in front panel LEDs show switch and power status. Add CXM switches along with controls to complete the system.



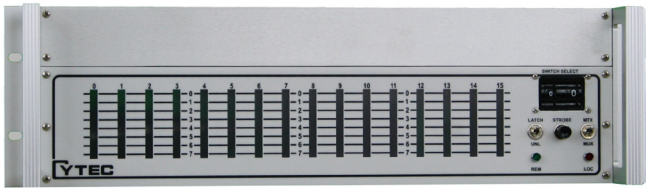
Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
3.5" (2 RU) high (89 mm)
Weight: 15 lbs (6.8 kg) max.
AC Power : 10 W per closed switch- 115/230 VAC selectable.



CXM/32 with IEEE488, RS232 and LAN Control

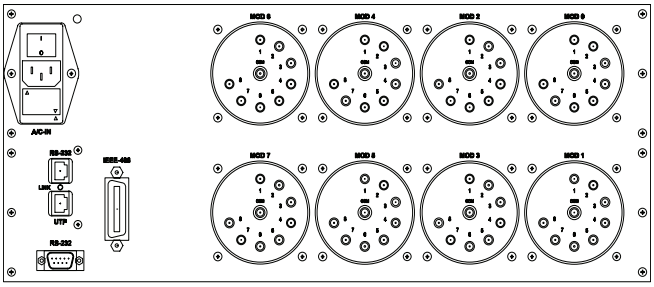
CXM/64 MAINFRAME OR -E EXPANSION CHASSIS

These Chassis control up to 64 switch points as defined by the user. Front panel LEDs indicate both switch point and power status. Add controls, the required CXM switches and one CL8-VHP Display module for every eight switch points to complete the system.



Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
5.25" (3 RU) or 7" (4 RU) high if needed for relays.
Weight: 25 lbs (11 kg) max
AC Power : 10 W per closed switch- 115/230 VAC selectable

Up to 64 1x2 relays, 16 1x4 relays or 8 1x8 relays per chassis.
Up to eight, 8 bit programmable attenuators.
Combinations, specials and custom systems with no NRE.



CXM/64 with IEEE488, RS232 & LAN Control

CXM MATRICES

Bidirectional NxM Matrices are assembled by interconnecting the required number of individual microwave switches as shown in **Fig. 1**. The matrix is nonblocking, but not full fan-out. Nonblocking means that any input can be connected to any output without interrupting a previously set path. When a matrix is not full fan-out, an input may be switched to only one output. Matrix configurations from 2x2 to 8x8 or larger are possible. The switches and interconnects are assembled inside the chassis. The input and output connectors (typically SMAs) are mounted on the rear panel. Unidirectional full fan-out systems and bidirectional full fan-out systems are also available. Just call and ask.

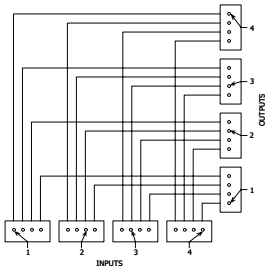


Fig. 1 4x4 Matrix Using Eight CXM/4x1 Switches

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

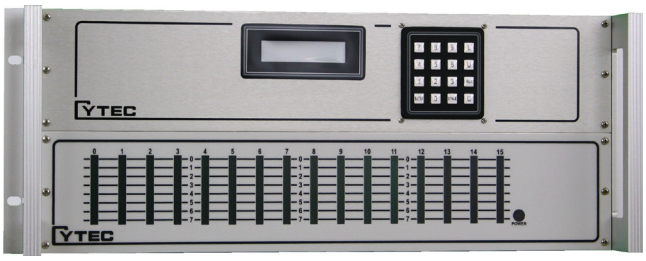
CXM/128 MAINFRAME OR -E EXPANSION CHASSIS

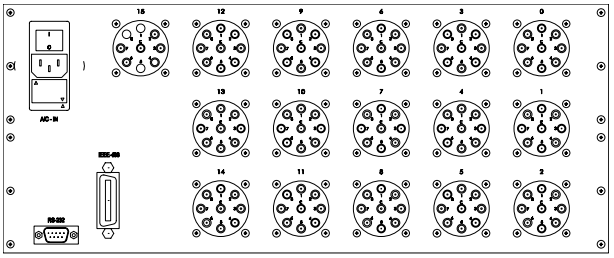
These Chassis control up to sixteen 1x8 CXM switches arranged as shown on the drawing, or combinations of 1x2, 1x4 and 1x8 switches. LEDs visible through the front panel show switch and power Status. Add CXM switches, controls, and one CL8-VHP Display module for every eight switch points to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
7" (4 RU) high (178 mm)
Weight: 30 lbs (14 kg) max
AC Power : 10 W per closed switch- 115/230 VAC selectable

Can control any combination of 1x2 through 1x8 relays and 8 bit programmable attenuators.

Combinations, specials and custom systems with no NRE.
Also available as relay driver chassis to drive your external relays.





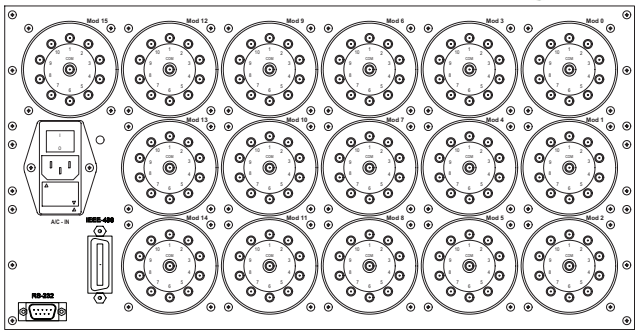
CXM/128 with IEEE488, RS232 and LAN Control

CXM/256 MAINFRAME OR -E EXPANSION CHASSIS

This Chassis typically controls up to sixteen CXM/9x1 through 12x1 relays, although other configurations are possible when you need up to 256 drives in a single chassis. LEDs visible through the front panel show switch and power Status. Add CXM switches, controls and one CL16-VHP Display Module for every 16 switch points to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
7" (4 RU), 8.75" (5 RU) or 10.5" high
Weight: 45 lbs (16 kg) max
AC Power : 10 W per closed switch- 115/230VAC selectable

Create custom systems or special configurations.
Chassis is available with D connectors on the rear panel to simply drive your own +28 volt external relays or components.



CXM/256 with IEEEE-488 & RS232

CXM MULTIPLEXERS

Nx1 Multiplexers are assembled from standard CXM Chassis by interconnecting microwave switches as shown schematically in **Fig. 2**. The interconnects are typically semirigid coaxial cables and are wired on the rear panel.
Configurations as large as 1x1728 can be built by going through only 3 stages of 1x12 relays.

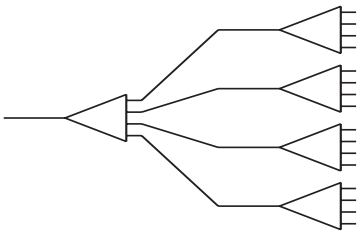


Fig. 2 16x1 Multiplexer using five CXM/4x1 Switches

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CXM EXPANSION CHASSIS

All CXM Chassis can be built as either stand-alone mainframes or expansion Chassis. Multiple expansion chassis are controlled via a single MESA control chassis. This design allows configuration of large, complex systems with one point of control. Using a Mesa controller along with several expansion chassis has the following advantages:

Cost Savings

Expansion chassis do not require their own control modules or manual controls, which results in cost savings that pay for the MESA on any system using three or more expansion chassis.

Single Point of Control

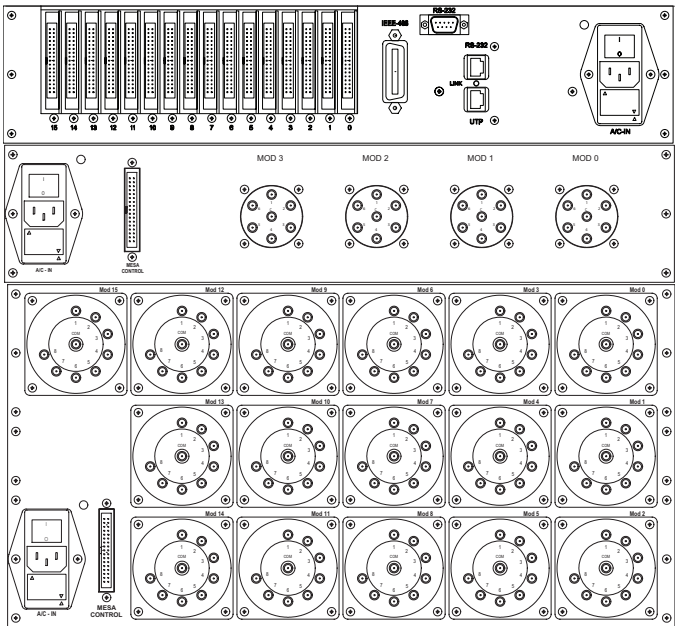
Using a single GPIB address, RS232 Port or TCP/IP address, you can control up to 32 CXM chassis, or combinations of different series chassis, from a single MESA.

Remote Location of Expansion Chassis

Expansion chassis can be located up to 125 feet from the MESA, so the switching chassis can be placed where needed and still not require a dedicated control module.

Complex Test Systems

Since any Cytec chassis may be controlled from the MESA, you can build complicated systems switching a number of different signal types by using different Cytec products for each signal type. For example, RF signals, AC power, and high speed digital signals could all be switched with a single, muti-chassis system.



MESA Control Mainframe with CXM/32-E and CXM/128-E Expansion Chassis

LED INDICATORS / STATUS FEEDBACK

All CXM chassis have front panels LED displays that show the Status of every switch point, which provides an invaluable aid for program debugging and troubleshooting. One LED is assigned to every switch point, and you can verify Status by simply watching the front panel.

CXM/16 and CXM/32 LED Indicators

LEDs are built into the front panel and are included in the chassis prices.

CXM/64 and CXM/128 LEDs - CL8-VHP Modules

LEDs are supplied by CL8-VHP Display/Driver Module, each of which provides eight relays drives and status LEDs. These modules must be purchased separately.

CXM/256 LED Indicators - CL16-VHP Modules

LEDs are are built into the CL16-VHP Display/Driver Module, which also supplies 16 relay drives. These are purchased separately.

CXM CUSTOM CHASSIS

Cytec can usually customize your chassis to meet specific requirements with little or no additional NRE (Non Recurring Engineering) charges. The following examples are only some of the options available. If you don't see what you need feel free to ask us if it can be done. Our engineers will work with you to provide a tailored solution for your specific application.

Labeling

Cytec's laser etch labeling system allows rapid custom labeling of front or rear panels. Silk screening options or custom poly carbonite overlays are also available for OEM systems.

Configuration

Cytec can preconfigure your system according to your exact needs. Some examples are:

- Include RF amplifiers to boost signals.
- Built in programmable attentuators reduce signals by a defined amount (1, 2, 4, 8 dB, etc.).
- Splitter/Combiners divide or mix signals as required.
- Directional couplers provide sampling ports.

Don't see what you need? Just ask!

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

CXM COAXIAL MICROWAVE SWITCHES

Standard CXM Switches are 50 ohm, bi-directional, failsafe, Normally Open switches with a bandpass of DC to 18 GHz. Microwave switches from 1x2 to 1x12 are available, and SMA connectors are standard.

OPTIONAL FEATURES INCLUDE: Failsafe default to Port 0 closed, latching actuators, BNC, TNC or N Connectors, unused input ports terminated to 50 ohms and higher frequency or power handling capacity. All options are not available on all models; contact one of our expert Sales Engineers for more information.

CXM/2x1-F (Form C)

Is a SPDT microwave switch that defaults to its NC position. Options include connector type, higher RF power handling abiliy, unused port termination and latching actuators.

CXM/2x1-F-SMA

CXM/4X1-NO SWITCH

Is a Single Pole 4 -Throw Normally Open microwave switch. Options include connector type, higher RF power, latching actuators, failsafe operation, terminations and frequencies to 40 GHz.

CXM/6X1-NO SWITCH

Same as the CXM/4x1, but in a SP6T configuration. The same options are available.

CXM/6x1-NO-SMA

CXM/8X1-NO & CXM/10X1-NO SWITCH MODULES

Are SP8T and SP10T configurations. Different connectors are optionally availalble.

CXM/10x1-NO-SMA

CXM TRANSFER SWITCH

Transfer Switches have four ports and two switch postions. Postion 1 connects Ports J1 to J4 and J2 to J3. Postion 2 connects J1 to J2 and Ports J3 to J4. Options include different connectors and frequencies to 40 GHz. See **Fig. 3.**

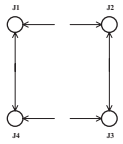


Fig. 3 CXM Transfer Switch

SWITCH MODULES SPECIFICATIONS

Microwave Switch specifications vary depending on the options selected. The following are typical:

	1 GHz	18 GHz
Insertion Loss	0.3 dB	0.8 dB
Isolation	-80 dB	-60 dB
VSWR	<1.2:1	<1.5:1
Switching Time	<15 ms	<15 ms
RF Power, SMAs *	150 W	40 W
RF Power, Type N **	300 W	90 W at 14 GHz

Notes:
*** RF Power is CW cold switching at frequency indicated.**
**** Type N Connectors rated to 12 GHz only.**

Specifications are for switches only. Cabling or connector options may decrease some ratings. Call for specifications on assembled systems.

CXM TERMINATED SWITCHES

Self-terminating Microwave Switches connnect all unused input port to ground via 50 ohm terminations. Available with all multipostion switches from CXM/2x1-T to CXM/10-T. Terminations can handle 2 watts CW. See **Fig. 4** for a schematic of a terminated CXM/2x1-T.

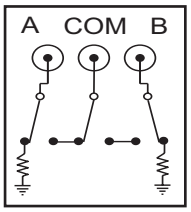


Fig. 4 CXM/2x1-T Terminated Switch

CXM/2X1-T-SMA (TERMINATED)

Is a SPDT Microwave Switch with both inputs terminated to 50 ohms when not switched. See **Fig. 4**. Options include latching actuators and frequencies to 26.5 GHz.

CXM/4X1-T-SMA & CXM/6X1-T

Are Single Pole 4 Throw and SP6T with non-switched inputs terminated to 50 ohms. Options include latching actuators and frequences to 40 GHz.

CXM/8X1-T-SMA & CXM/10X1-T

Are SP8T and SP10T with non-switched inputs terminated to 50 ohms as shown in **Fig. 5.** Options include latching actuators and frequences to 40 GHz.

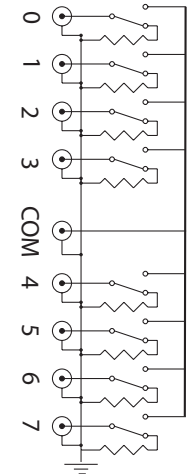


Fig. 5 CXM/8x1-T Terminated Switch

CONNECTOR OPTIONS

SMA Connectors are standard on all Microwave Switches rated up to 26 GHz. Optional connectors include **K Type** rated at DC to 40 GHz and **N** or **TNC** rated for higher power but lower freqency applications. Not all connectors are available on all switch types; for example, Terminated Switches are only built with SMA or K Type. Please contact the factory for more information.

LATCHING or FAILSAFE ACTUATORS

Microwave Switches with optional **Latching Actuators** remain in their current switched positions until switched by the user to another positon, even if power is removed. Switches with optional **Failsafe Actuators** return to Port 0 closed when power is removed.

DON'T SEE WHAT YOU NEED? PLEASE CALL FOR MORE OPTIONS

Cytec currently uses relays and microwave components from multiple vendors. If you have a favorite component manufacturer we'll be happy to use them.

PROGRAMMABLE ATTENUATORS, SPLITTER/COMBINERS

On a semi-custom basis RF devices such as Programmable Attenuators, Splitter/Combiners and Directional Couplers can be installed inside your CXM Chassis to furnish a complete, turn-key test setup.

PROGRAMMABLE ATTENUATORS

Relay based and solid state attenuators are available in a variety of step sizes (such as 1 dB, 2 dB, 4 dB, 8 dB, etc.) and frequency ranges. Step size control is via Cytec's standard, simple programming commands. Including attenuators as part of the switching systems permits the end user to consistently, repeatable program precise signal attenuation steps. See **Fig. 6**.

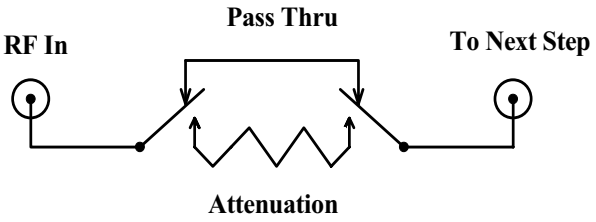


Fig. 6 Relay-based Programmable Attenuator

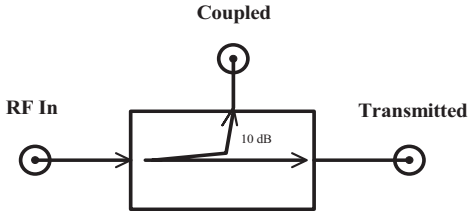


Fig. 8 Directional Coupler -10 dB

CYTEC SWITCH SOFTWARE

Check out the latest version of free GUI software on our webpage at: http://cytec-ate.com/support
The software runs on Windows XP or later. Source code available on request.

SOFTWARE HELP

Free drivers and/or sample programs are available for most commonly available application programming languages.

WARRANTY

All CXM Series Microwave Relays include a full one year warranty. All other system components include five year warranties.

MANUAL CONTROL OPTION

Manual Controls are available for all mainframe chassis.

CXM/16 and **CXM/32** chassis can be purchased with optional pushbutton manual controls PB/16 or PB/32.

CXM/64, CXM/128 and **CXM/256** mainframes can be built with with optional keypad manual controls MC-2.

POWER DIVIDERS/COMBINERS

Are passive devices that offer high directivity and good port to port matching. 2 - way, 4 - way, 8 - way and 16 - way Power Dividers/Combiners can be included as part of your microwave system. Inductive and Resistive Dividers are offered that have low insertion losses and VSWRs and frequencies as high as 18 GHz. Contact factory for more information. See **Fig. 7**.

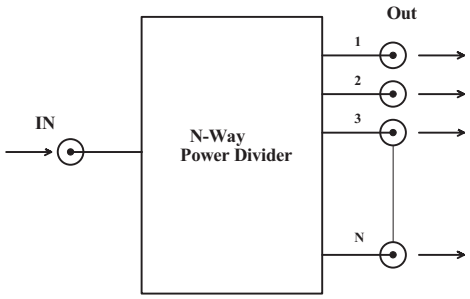


Fig. 7 1 : N Power Divider/Coupler

DIRECTIONAL COUPLERS

A Dictional Coupler has three ports: input, transmitted and coupled. It couples part of the transmission power to the coupled port by a know amount, typically -10 dB, -20 dB or -30 dB. The coupled output can be used to measure information (for example, power level and frequency) without interrupting the main RF power flow. See **Fig.8**.

CONTROL MODULES

IF-5C IEEE488/RS232 16 and 32 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all CXM/16 or CXM/32 chassis.

IF-5 IEEE488/RS232 64 and 128 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all CXM/64, CXM/128 or CXM/256 chassis.

IF-9 Ethernet LAN / RS232 Control for all CXM Chassis
This module has 3 ports available as 10/100 Ethernet and an RS232 com port. All ports are available and active at all times. Telnet default port 23 can be turned off.

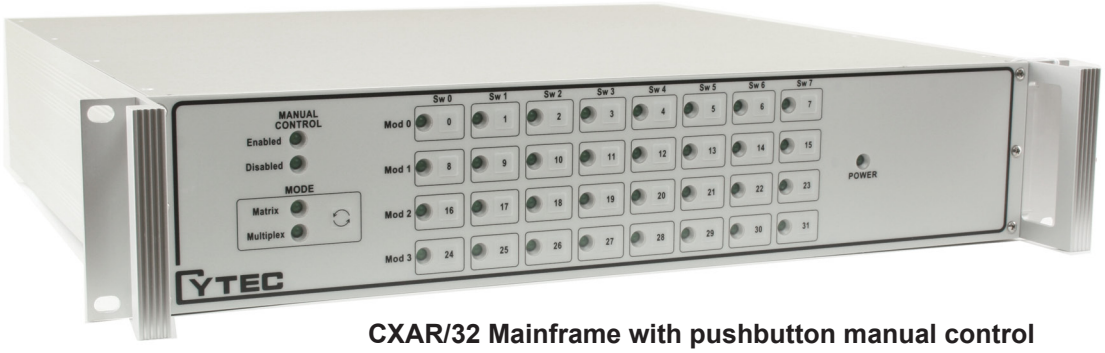
IF-6 LAN INTERFACE
This Module uses Ethernet TCP/IP to provide control from a Local Area Network to the Cytec RS232 port. It can be added to existing IF-5C or IF-5 Control Modules to give an Ethernet option or purchased with them so you can have all three control interfaces (GPIB, RS232 and 10BaseT Ethernet).

Contact Cytec for technical questions or support at:
1-800-346-3117 or 585-381-4740
Email: sales@cytec-ate.com
Web: cytec-ate.com

2555 Baird Road, Penfield, New York 14526 • cytec-ate.com • (800)346-3117 • (585)381-4740

CXAR SERIES
COAXIAL SWITCHING SYSTEMS

The CXAR Series are Computer Controlled Coaxial Switching Systems for 50 or 75 ohm RF Signals up to 1.6 GHz, or Low Leakage signals down to 100 Femto amps. These systems are typically used to configure 1xN multiplexers. Both Mainframes and Expansion Chassis are offered and hold a variety of different switch modules to form the desired configuration.



CXAR/32 Mainframe with pushbutton manual control

FEATURES:

- **RF Systems with Bandpass from DC to 1.6 GHz, 50 or 75 Ohm Impedance and low crosstalk.**
- **Low Leakage modules for current measurements down to 100 femto amps or resistance up to 100 terra ohms.**
- **Low cost reed relay 1 or 2 pole coaxial modules for high speed, long life switching of signals below 100 MHz.**
- **Computer Control from IEEE488 BUS, RS232 Serial, 10BaseT LAN, TTL or USB.**
- **LED Front Panel Display and Status Feedback to Computer for visual indication and debugging.**
- **Manual Control Option for use without computer control.**

CHASSIS:

The **CXAR** Units are 19" rack mounted chassis, and are available as either Mainframes or Expansion Chassis pre-wired to accept any of the CXR Series of Coaxial Switch Modules. All chassis have front panel LEDs showing latched switch points and have I/O connectors mounted through the rear panel.

CXAR/16 Mainframe or -E Expansion Chassis - 16 relay drives allow for two 8x1 modules or four 4x1 modules.
CXAR/32 Mainframe or -E Expansion Chassis - 32 relay drives for four 8x1 modules, eight 4x1 modules or combinations.
CXAR/64 Mainframe or -E Expansion Chassis - Up to 64 relay drives. Control up to 16 4x1 modules in a 5.25" high chassis.
CXAR/128Mainframe or -E Expansion Chassis - Up to 128 relay drives. Control up to 16 8x1 modules or 8 16x1 modules in a 7" high chassis.

SWITCH MODULES:

There are five series of Switch Modules. Each series has design features tailored to specific needs.

CXR Series use coaxial reed relays and are available with a bandpass up to 200 MHz. BNC or Screw Terminal Connectors.
CXR-G Series use armature relays in a tree configuration and have a bandpass exceeding 1 GHz. BNC or SMA Connectors.
CXR-2A Series use two pole relays to switch balanced line signals and have bandpass up to 200 MHz. BNC's or Twin-ax.
CXR-LL Series use single pole low leakage relays for currents as low as femto amps or resistance as high as terra ohms.
CXS Series use solid state relays for high reliability 50 or 75 ohm switching.

CONTROL MODULES:

All systems available with IEEE488 (GPIB), RS232, Ethernet LAN, TTL or USB Control.

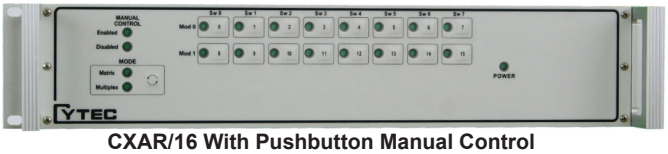
CXAR CHASSIS

The CXAR Chassis are 19" rack mounting units with power supplies and are pre-wired to accept the CXR Series of Switch Modules. The Switch Modules are mounted so that their I/O connectors protrude through the rear panel. The front panels have discrete LEDs showing the status of all switch points and also provide optional manual controls.

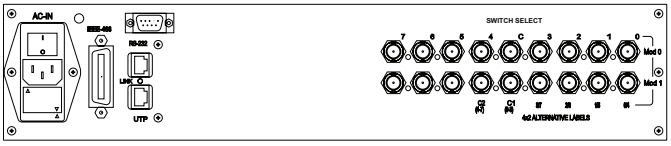
CXAR/16 MAINFRAME OR -E EXPANSION CHASSIS

These Chassis control up to 16 switch points in any configuration. LEDs on the front panel show switch and power status. Add Switch Module(s) and a Control Module to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
3.5" (2 RU) high (89 mm)
Weight: 15 lbs (6.8 Kg) max
AC Power : 10 Watts max. 110/220 selectable.



CXAR/16 With Pushbutton Manual Control

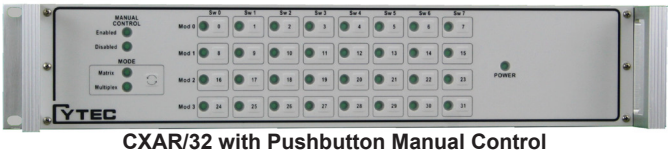


CXAR/16 Rear Panel with IEEE488, RS232 and LAN Control

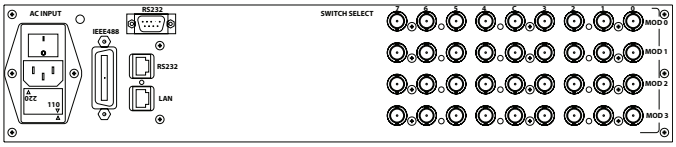
CXAR/32 MAINFRAME OR -E EXPANSION CHASSIS

These Chassis control up to 32 switch points in any configuration. LEDs on the front panel show switch and power status. Add Switch Module(s) and a Control Module to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
3.5" (2 RU) high (89 mm)
Weight: 17 lbs (7.7 Kg) max
AC Power : 13 Watts max. 110/220 selectable.



CXAR/32 with Pushbutton Manual Control

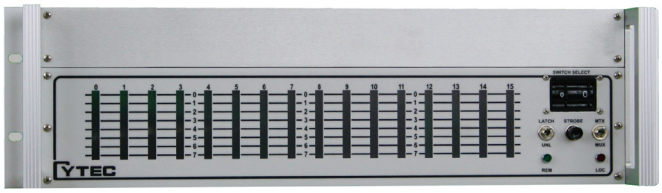


CXAR/32 Rear Panel with IEEE488, RS232 and LAN Control

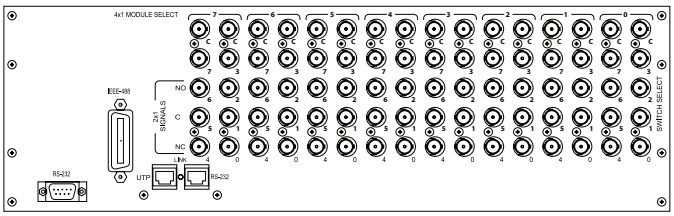
CXAR/64 MAINFRAME OR -E EXPANSION CHASSIS

These Chassis control up to 16/1x4 individual switch modules arranged as shown in the drawing. LEDs on the front panel indicate switch and power status. Add 1x4 Switch Modules, a Control Module, and one CL8 Display module for every two 1x4 modules to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
5.25" (3 RU) high (133 mm)
Weight: 20 lbs (9.1 Kg) max
AC Power : 22 watts max - 110/220 selectable.



CXAR/64 with Thumbwheel Manual Control



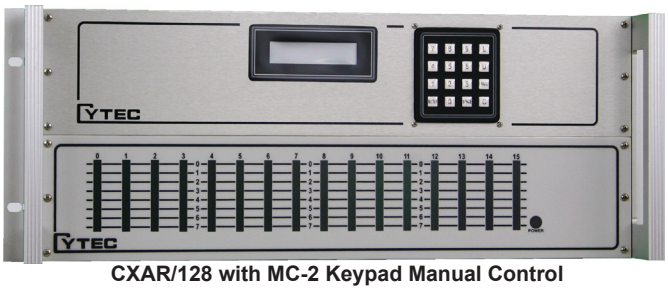
CXAR/64 Rear Panel with IEEE488, RS232 and LAN Control

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

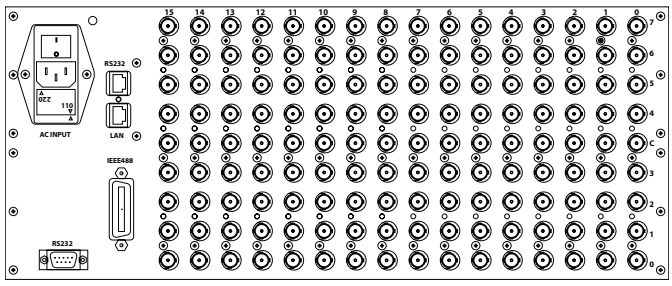
CXAR/128 MAINFRAME OR -E EXPANSION CHASSIS

These Chassis control up to 16 1x8 switch modules arranged as shown in the drawing or combinations of 1x2, 1x4 and 1x8 modules. LEDs on the front panel show Switch and Power Status. Add Switch Modules, a Control Module, and one CL8 Display module for each eight switch points to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
7" (4 RU) high (178 mm)
Weight: 25 lbs (11.4 Kg) max
AC Power : 30 watts max. 110/220 selectable



CXAR/128 with MC-2 Keypad Manual Control



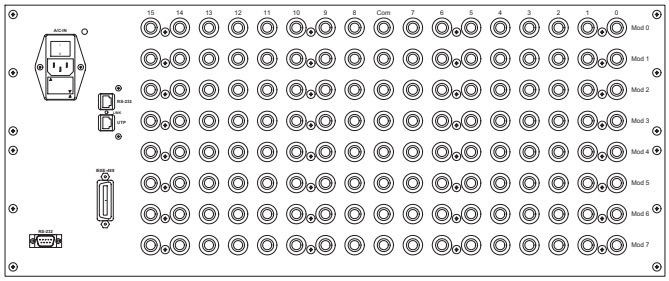
CXAR/128 RearPanel with IEEEE-488, RS232 and LAN Control

CXAR/8(16x1) MAINFRAME OR -E EXPANSION CHASSIS

This Chassis controls up to eight CXS/16x1-GT switch modules arranged as shown in the drawing or combinations of 1x2, 1x4, 1x8 and 1x16 modules. LEDs on the front panel show Switch and Power Status. Add Switch Modules, a Control Module, and one CLE-16 Display module for each 16 switch points to complete the system.

Dimensions: 19" Rack Mount (483 mm)
15" deep (381 mm)
7" (4 RU) high (178 mm)
Weight: 30 lbs (13.6 Kg) max
AC Power : 40 watts max. 110/220 selectable

CXAR/8(16x1) with MC-2 Keypad Manual Control


CXAR/8(16x1) RearPanel with IEEEE-488, RS232 and LAN

ALL CHASSIS

Material: Gray Anodized extruded or sheet aluminum with a polycarbonate front panel overlay.
Mounting Hardware: Rack Mount handles are standard. Flush mount flanges available at no cost.
Protection: Selectable AC input fused at: 2 amps 110 VAC, 1 amp 220 VAC.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

CXAR EXPANSION CHASSIS

All CXAR Chassis are available as Expansion Chassis for use with a MESA Control Chassis. This design allows configuration of large or complex systems with one point of control. Using a Mesa Controller and multiple Expansion Chassis has the following advantages:

Cost Savings

Expansion chassis do not need power supplies or their own Control Modules or Manual Controls, which adds up to cost savings that pay for the Mesa on any system requiring three or more expansion chassis.

Single Point of Control

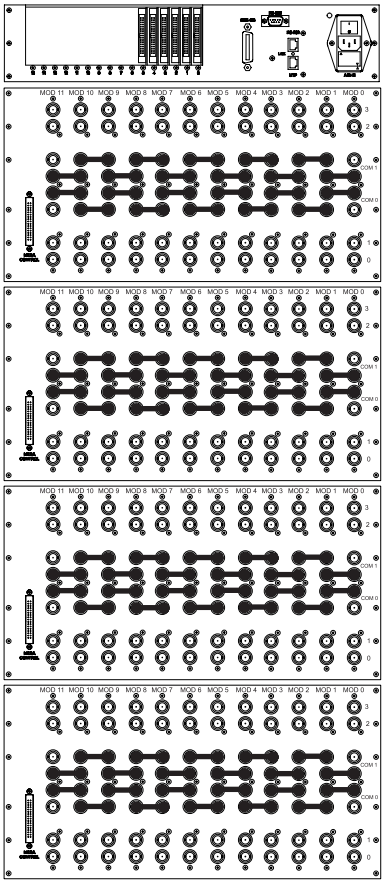
You can control up to 32 CXAR chassis, or combinations of different chassis, from a single Mesa Control. This allows control of up to 32 chassis from a single GPIB address, RS232 Port or LAN IP address.

Remote Location of Multiple Chassis

Expansion Chassis can be located up to 125' from the Mesa, so the switching chassis can be located where needed and still not require a separate control.

Complex Test Systems

Since any Cytec chassis may be controlled from the Mesa, you can build complicated systems switching a number of different signal types using different Cytec products for each signal type.



Mesa Example - 256x2 Low Leakage Coax System

LED INDICATORS / STATUS FEEDBACK

All CXAR Mainframe and Expansion Chassis have LED displays that show state of every relay. These LED indicators are visible on the front panel and correspond to the programmatic address for each relay.

The LEDs provide an invaluable aid for program debugging and troubleshooting. They allow you to verify switch point staus instantly simply by watching the system's front panel.

CXAR/16 and CXAR/32 LED Indicators

On these systems the LEDs are built into the front panel of the chassis and are included in the chassis prices.

CXAR/64 and CXAR/128 LED Indicators -- CL8 Modules

On these systems the LEDs are provided by a CL8 Display / Driver Modules which must be purchased separately. Each CL8 module provides eight relay drives and LEDs so they are not optional, and one CL8 is required for every eight switch points. The display / driver is also sold separatly because some customers use them to drive external relays, or they buy sets of different switch modules for different applications and separate CL8's reduce the total price.

CXAR CUSTOM CHASSIS

Cytec can easily customize your chassis to fit specific needs with little or no NRE (Non Recurring Engineering) charges. The following examples are only some of the options available. If you don't see what you need feel free to ask us if it can be done. Our engineers will work with you to provide a tailored solution for your specific application.

Labeling

Cytec's laser etch labeling system allows rapid custom labeling of front or rear panels. Silk screening options or custom poly carbonite overlays are also available for OEM systems.

Configuration

Cytec can preconfigure your system according to your exact needs. Some examples are listed below:

- Build large multiplexers using bus bars or interconnecting tree switches in series.
- Build large group switches with parallel drive wiring.
- Custom configured modules.
- Customized connectors, false rear panels or patch panels.

Don't see it? Just ask!

Chassis Dimensions or Mounting Options

We can build chassis with different dimensions or mounting options, including reverse mounting the chassis to get the connector out of the front, add connectors to the front panel or flush mount the chassis for tight rack enclosures.

Custom components

Need a system with non-Cytec components added to get the exact performance you need? Just let us know what you want to accomplish. We can add splitters, amps, couplers and other RF components to give you exactly what you need.

CXR REED OR ARMATURE RELAY SWITCH MODULES

These switch modules use reed or armature relays interconnected by characteristic impedance striplines and are completely bi-directional. They are an excellent , cost effective choice for applications below 200 MHz. BNC connectors are standard. Bus bars are available to build larger configurations, but lower bandpass. These modules provide the best solution for lower frequency applications that require coaxial connections.

CXR/2x1-1S or -2S (Form A)

This module switches a common port between A, B or OFF positions as shown in **Fig. 1**. Module uses single or two pole, **Type S** reed relays. **Bandpass** is **400 MHz** (-3 dB). **Crosstalk** is **-60 dB** at **5 MHz.**

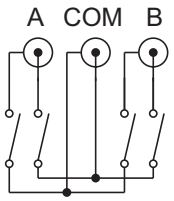


Fig. 1

CXR/8x1-1T-BNC

This module has single pole **Type T** relays which terminate the inputs to the required impedance as shown in **Fig. 2**. Energizing the selected relay removes the termination from the input and closes the circuit.

CXR/8x1-1S-BNC

This is the same configuration but without termination.

CXR/4x1-1T-BNC

This is the same terminated configuration but with only four relays.

CXR/4x1-1S-BNC

This is the same configuration with only four relays and without terminations.

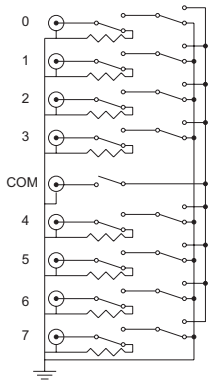


Fig. 2

CXR/8x1-2A

This is an 8x1 two pole configuration as shown in **Fig. 3**. Ideal for switching balanced line 100 ohm differential pairs. It is available with isolated BNC's or Twin BNC connectors (Twinax), and uses **Type 2A relays.**

CXR/4x1-2A

This is the same 2 wire module but as a 4x1 configuration.

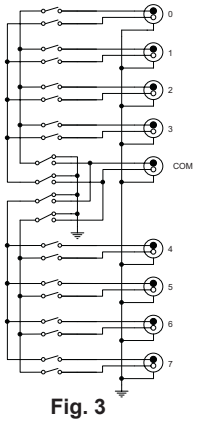


Fig. 3

CXR/2x1-2C (Form C)

A two pole 2x1, Form C configuration as shown in **Fig. 4** which allow one input to be switched to two outputs (A or B). Available with **BNC** or **Twin BNC** connectors, and uses **Type A**, Armature relays. This module defaults to a normally closed position when off. Bandpass of 200 MHz (differential into 100 ohms).

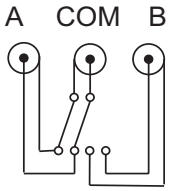


Fig. 4

CXR/8x1-1HT

This is a High Isolation Module with relays which terminate the inputs to the required impedance, and they have additional isolation relays as shown in **Fig. 5** which decrease the crosstalk between channels by 20dB. Energizing a relay removes the terminating impedance and completes the selected path.

CXR/8x1-HS

Has the same high isolation characteristics as the model -1HT but without input terminations.

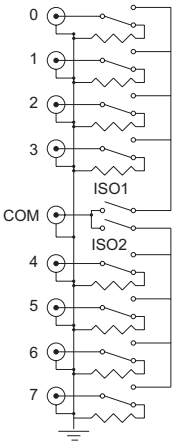


Fig. 5

CXR/4x1-1HT

Has the same characteristics and configuration but with only four relays.

CXR/4x1-1HS

Is the same as the model -1HT but without termination.

HIGH FREQUENCY SPECIFICATIONS

Type	Bandpass MHz	Isolation @ 100 MHz
CXR/8x1-1 and 4x1-1	300	60dB
CXR/8x1-T and 4x1IT	300	65dB
CXR/8x1-HS and 8x1-HC	250	70dB
CXR/4x1-HS and 4x1-HT	300	70dB
CXR/8x1-2A and 4x1-2A	200	45dB

SWITCH CHARACTERISTICS

	Type S	Type T	Type 2A
Switch Voltage	200V	200V	110 V
Switch Current	0.5A	0.25A	1.0A
Breakdown Voltage	400V	200V	750V
Operating Time	1ms	1ms	3 ms
Life Expectancy	10^{8*}	10^{8}	$2x10^{5*}$
Contact Rating	10VA	3VA	60VA

* @ 900 MHz 10 Watts

CXR-G SWITCH MODULES

These modules are designed with Type G coaxial relays arranged in a tree configurationas shown in Figs. 6 through 8 with on board logic that selects the appropriate relays to connect the selected input to the common. Only one input can be switched to one output, and in the unenergized state or input #0 is connected to the common, except the terminated modules which have an open condition. All -G Modules are available with 50 or 75 ohm characteristic impedance. 50 Ohm modules are available with SMA or BNC connectors. 75 Ohm modules have BNC's only. Combinations of these modules can be assembled to form larger multiplexers or matrices.

CXR/2x1-G (Form C)

This module switches the common to one of two inputs as shown in **Fig. 6**. In the unenergized position, the common is connected to input A.

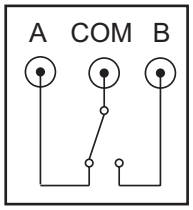


Fig. 6

CXR/2x1-GT (Form A)

This module is a version of the CXR/2x1-G module that has the unused A/B connection terminated into **50** or **75** ohm resistors as shown in **Fig 9**. This module allows an off state with both inputs terminated.

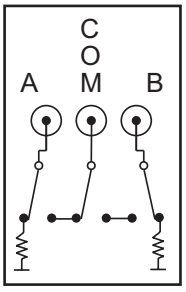


Fig. 9

CXR/8x1-G

Is a bidirectional 8x1 configuration as shown in **Fig. 7**. The module is normally closed to connector 0 when off.

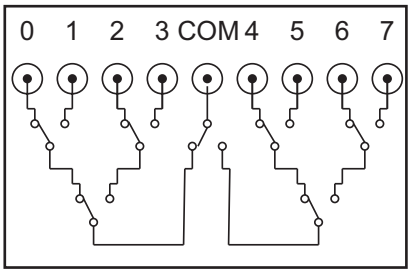


Fig. 7

CXR/8x1-GT TERMINATED MODULE

This module switches any one of eight **50** or **75** ohm terminated coaxial inputs to one output as shown in **Fig. 10**. Switching any input removes the termination from that input and connects it to the common.

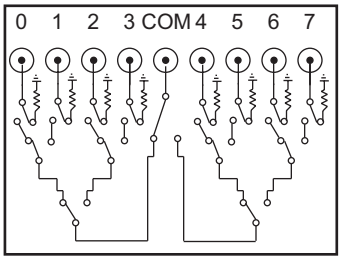


Fig. 10

CXR/4x1-G

This module is a bidirectional 4x1 configuration using connectors 0 thru 3 of **Fig. 7**. It is available with the same connectors and has the same bandpass and isolation as the 8x1 module.

CXR/4x1-GT TERMINATED MODULE

Switches any one of four coaxial inputs to common using inputs 0 thru 3 of **Fig. 10**. It is available with the same connectors and has the same bandpass and isolation as the 8x1 module.

CXR/4x2-G

This module switches any two of 4 coaxial ports to the two commons as shown in **Fig. 8.**

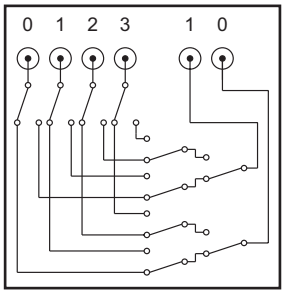


Fig. 8

RELAY SPECIFICATIONS

Switched Power	10 Watts (40 dBm)
Carry Power	20 Watts
Termination rating	5 Watts
Operating Time	3 ms
Life Expectancy*	$3x10^5$
Max Voltage	30 VDC

* @ 900 MHz 10 Watts

	Insertion Loss			Isolation			VSWR
	.5 GHZ	1 GHz	-3 dB Point	.5 GHZ	1 GHz	2 GHz	
CXR/2x1-G-50-SMA or BNC	0.25 dB	.5 dB	2.0 GHz	-65 dB	-55 dB	-40 dB	<1.25:1 @ 1 GHz
CXR/2x1-G-75-BNC	0.6 dB	2.0 dB	1.3 GHz	-65 dB	-50 dB	NA	<1.25:1 @ 750 MHz
CXR/2x1-GT-50-SMA or BNC	0.4 dB	1.4 dB	1.6 GHz	-70 dB	-60 dB	-50 dB	<1.3:1 @ 1 GHz
CXR/2x1-GT-75-BNC	0.8 dB	2.8 dB	1.1 GHz	-70 dB	-55 dB	NA	<1.3:1 @ 900 MHz
CXR/8x1-G-50 -SMA or BNC	0.5 dB	.9 dB	2.3 dB	-70 db	-65 dB	-50 dB	<1.3:1 @ 1 GHz
CXR/8x1-G-75-BNC	1.2 dB	2.5 dB	1.2 GHz	-65 dB	-50 dB	NA	<1.3:1 @ 750 MHz
CXR/8x1-GT-50-SMA or BNC	0.7 dB	1.4 dB	1.5 GHz	-70 db	-65 dB	-50 dB	<1.3:1 @ 1 GHz
CXR/8x1-GT-75-BNC	1.3 dB	3.0 dB	1.0 GHz	-65 dB	-50 dB	NA	<1.3:1 @ 750 MHz
CXR/4x2-G-50-SMA	1.4 dB	2.4 dB	1.2 GHz	-60 dB	-50 dB	NA	<1.3:1 @ 650 MHz
CXR/4x2-G-75-BNC	1.5 dB	3.5 dB	800 MHz	-60 dB	-45 dB	NA	<1.3:1 @ 500 MHz

CXR LOW LEAKAGE MODULE

This module is designed with for applications where you need to measure extremely low currents or extremely high resistence. The module is arranged as two 4x1 sections that can be wired as an 8x1, 4x2 or many other configurations. A schematical representation of the module is shown in Fig. 11. Many jumpering options allow this module to be grounded or ungrounded or used with a driven guard circuit to improve speed and accuracy. Above board wiring with coax cables keeps noise and charge times to a minimum. Combinations of these modules can be assembled to form larger multiplexers or matrices. Contact a Cytec specialist to discuss which options are best for your specific application.

CXR/2(4x1)-LL SWITCH MODULE

Dual 4x1 low leakage modules can be used to measure currents down to 50 femtoamps (5x10E-14 amps), or resistances up to teraohms (10E+12). Maximum switched voltage of 1500 VAC. It is available with either BNC (normal low leakage), Triax (fast driven guard) or SHV (> 100 Tera ohms) connectors.

The module may be used in Cytec CXAR Series 16, 32, or 10.5" high 128 channel chassis. Bus bars are available to form larger multiplexers or matrices. Custom configurations are available.

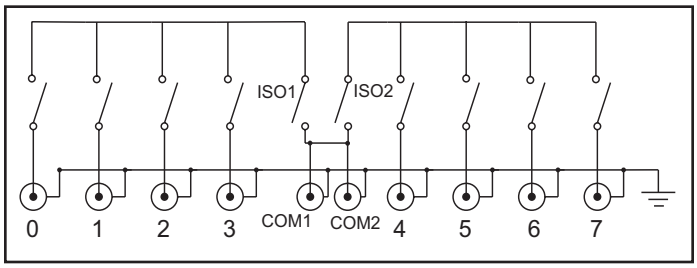


Fig. 11

CXS SOLID STATE CABLE TV or MODEM MODULE

These modules are designed for 75 ohm applications operating at frequencies from DC to 1 GHz, making them perfect for cable TV and cable modem applications. Terminated inputs and outputs guarantee impedance matching on unused channels. Insertion loss is flat within 1 dB over the range of 1 MHz to 1000 MHz.

CXS/8x1-GT-75 Switch Module

This switch is identical in function to the electro-mechanical relay version of our 75 ohm 1x8 mux, but the use of solid state components makes it operate with very good specifications over the frequencies of 1 to 900 MHz commonly used for cable modems and cable TV. Available with BNC or F type connectors. This switch module fits in any standard Cytec CXAR Series chassis.

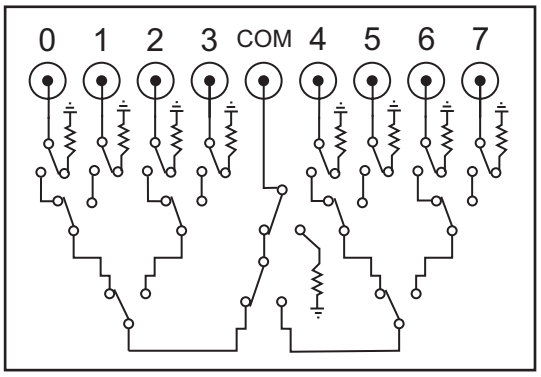


Fig. 12

	100 MHz	500 MHz	1000 MHz
INSERTION LOSS	-2.0 dB	-2.5 dB	-3 dB
ISOLATION	-60 dB	-55 dB	-50 dB

SWITCHED POWER	24 dBm (0.25 watts)
SWITCHING SPEED	< 1 ms
LIFE EXPECTANCY	$1x10^8$ operations

CXS/16x1-GT-75-F Switch Module

This is a 16x1 version of the solid state switch with F connectors as shown in Fig. 13. The specifications are the same as shown above.

Up to 8 of these modules may be installed into a standard Cytec CXAR/8(16x1) Mainframe or Expansion Chassis.

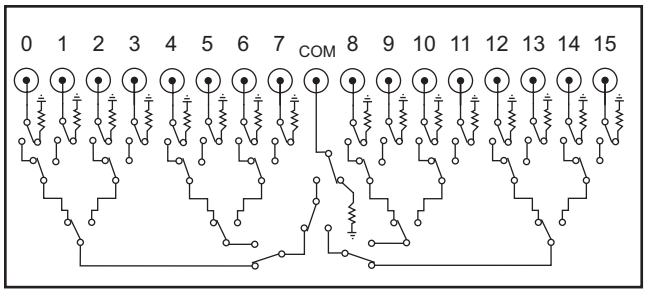


Fig. 13

CONTROL MODULES

IF-5C IEEE488/RS232 16 and 32 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all 16 or 32 channel chassis.

IF-5 IEEE488/RS232 64 and 128 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all 64 or 128 channel chassis.

IF-9 Ethernet LAN / RS232 Control for all Chassis
This module has 3 ports available as 10/100 Ethernet and an RS232 com port. All ports are available and active at all times. Telnet default port 23 can be turned off.

IF-6 LAN INTERFACE
This Module uses Ethernet TCP/IP to provide control from a Local Area Network to the Cytec RS232 port. It can be added to existing IF-5C or IF-5 Control Modules to give an Ethernet option or purchased with them so you can have all three control interfaces (GPIB, RS232 and 10BaseT Ethernet).

MANUAL CONTROL OPTIONS

Manual Controls are available for all mainframe chassis.
CXAR/16 and **CTC/16** chassis can be purchased with optional 16 channel pushbutton manual control PB/16.
CXAR/32, CTC/32 and CTA/32 mainframes use PB/32 thirty-two channel pushbuttons.
CXAR/64 and **CTC/64** mainframes are built with thumbwheel manual controls MC/64-TW.
CXAR/128, CTA/128 and CTC/64 chassis can be built with keypad manual controls MC-2.

PATCH PANELS

Patch Panels are available to convert the standard switch module coaxial connectors (typically BNCs or SMAs) to a type specified by the customer, including Triax, Dual BNCs, and Twin BNCs. Please contact Cytec with your specific requirement.

FREE CYTEC SWITCH SOFTWARE

Check out the latest version of free GUI software on our webpage at: http://cytec-ate.com/support
The software runs on Windows XP or later. Source code available on request.

SOFTWARE HELP

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

OTHER HELPFUL COMPONENTS...

CXBS COAXIAL BUS STRIPS

The Bus Strips are used to connect between CXR Coaxial Switch Modules and are designed for maximum bandpass and minimum stub length. They are available to interconnect up to 16 modules. ***Can not*** be used with **Type G** or **Type 2A** Modules.

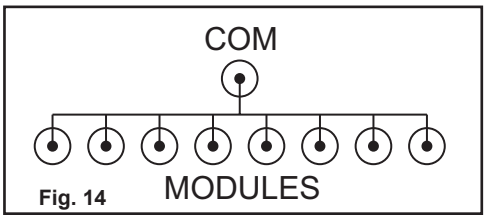


Fig. 14

CX/G AMPLIFIER

This amplifier has one BNC input and up to 3 BNC outputs. It can be used to restore signal levels or as a Signal Distributor to 3 Devices, as shown in **Fig. 15**. It has a **Bandpass** of **DC to 200 MHz** with a 4 volt p/p output and preset gains from 1 to 16. Impedances on both inputs and outputs can be preset for impedance matching.

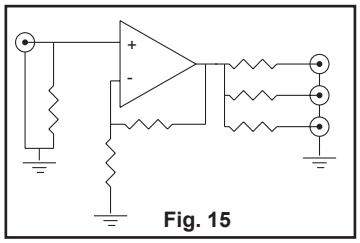


Fig. 15

CXR/1x8-PD POWER DIVIDER MODULE

This module is a 1x8 power divider intended for use between 5 MHz and 500 MHz. The module has a unity gain amplifier so that all 8 outputs maintain the signal input level (+/- 2 dB) in the given frequency range. The module is available with **SMA** or **BNC** connectors. A schematic is shown in **Fig. 16**.

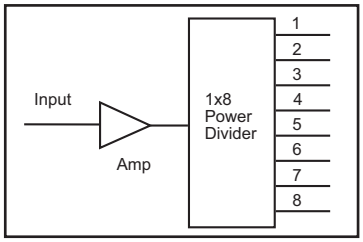


Fig. 16

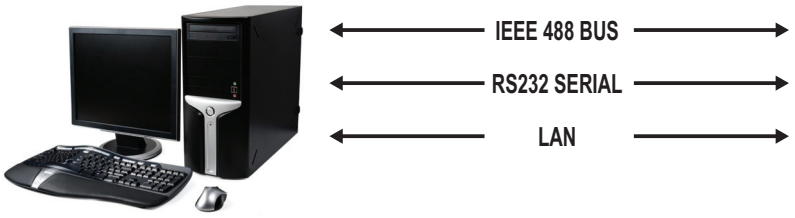
CUSTOM SYSTEMS ARE AVAILABLE.
DON'T SEE WHAT YOU NEED?
PLEASE CALL FOR MORE OPTIONS.

Contact Cytec for technical questions or support at:
Phone: 1-800-346-3117 or 585-381-4740
Email: sales@cytec-ate.com Web: cytec-ate.com

2555 Baird Road, Penfield, New York 14526 • cytec-ate.com • (800)346-3117 • (585)381-4740

CX SERIES
COAXIAL AND RF
SWITCHING MATRIX

The CX Series of Switching Matrices are available in a variety of single wire coax configurations designed to operate in the range from DC to 700 MHz with many options to minimize price while meeting the desired specifications.



CXG/8x8 50 ohm Mainframe

CX MAINFRAMES AND EXPANSION CHASSIS

CXB MAINFRAMES -- DC to 50 MHz
Modular Systems with BNC connectors available in incremental nonblocking configurations from 1x8 to 16x8, or from 2x4 to 32x4. 19" rackmount chassis, 3.5" high. See page CX-2 of bulletin for complete specifications.

CXE MAINFRAMES -- DC to 50 MHz
Modular Systems with BNC connectors available in incremental nonblocking configurations from 2x8 to 32x8. 19" rackmount chassis, 3.5" high. See page CX-2 of bulletin for complete specifications.

CXG MAINFRAMES -- DC to 700 MHz
Available as 4x8 or 8x8 nonblocking matrices in 50 or 75 ohm characteristic impedance. Available with BNC, SMA or user specified connectors. 19" rackmount chassis, 7" high. See page CX-3 of bulletin for complete specifications.

CXF MAINFRAMES -- 10 MHz to 500 MHz
Available as 4x8 or 8x8 nonblocking, full fan-out matrices with 50 ohm characteristic impedance. Available with BNC, or SMA connectors. 19" rackmount chassis, 7" high. See page CX-3 of bulletin for complete specifications.

CXL MAINFRAMES -- DC to 700 MHz
Affordable 8x8 blocking matrix with 50 ohm characteristic impedance. Available with BNC, SMA or user specified connectors. 19" rackmount chassis, 3.5" high. No LED indicators. See page CX-4 of bulletin for complete specs.

CONTROL OPTIONS

IF-5 IEEE488/RS232
This Module has both the IEEE488 (Talk /Listen) and the RS232 features detailed in Applications Bulletin AP-5.

IF-9 Ethernet LAN / RS232 Control for all CXM Chassis
This module has 3 ports available as 10/100 Ethernet and an RS232 com port. All ports are available and active at all times. Telnet default port 23 can be turned off.

IF-6 LAN INTERFACE
This Module uses Ethernet TCP/IP to provide control from a Local Area Network to the Cytec RS232 port. It can be added to existing IF-5C or IF-5 Control Modules to give an Ethernet option or purchased with them so you can have all three control interfaces (GPIB, RS232 and 10BaseT Ethernet).

MANUAL CONTROL OPTIONS

M/128-TW OR M/256-TW THUMBWHEEL CONTROLS
This manual control uses a thumbwheel selector and strobe button to select switchpoints.

MC/2 KEYPAD MANUAL CONTROL W/ LCD DISPLAY
This manual control has a keypad and LCD display of last command.

FREE CYTEC CONTROL SOFTWARE
Check out the latest version of free GUI software on our webpage at: http://cytec-ate.com/support
The software runs on Windows XP or later. Source code available on request.

CXB SERIES MODULAR SWITCH MATRIX

The CXB Series of Modular Coaxial Switch Matrices provide incremental matrix sizes from 2x4 or 1x8 up to 32x4 or 16x8. 50 ohm signals from DC to 50 MHz can be switched, with isolation of -50 dB at 50 MHz. Up to 16 CXB Switch modules and CL8 Display modules are plugged into the coaxial motherboard to supply the required matrix configurations as shown in Figs. 1 and 2. The CL8 Display modules provide visual indication of switch status to aid in troubleshooting test routines and debugging programming. The modules are available with Type S dry reed relays or Type M mercury wetted reed relays for up to 50 watt switching.

CXB CHASSIS

CXB/16x8 and **CXB/32x4** Mainframes and Expansion Chassis are built for either Nx8 or Nx4 Matrix configurations, where the number of installed switch modules determines the number of connections in the N direction. All systems are completely bidirectional, so either side of the matrix may be considered inputs or outputs. Expansion chassis are used with a MESA Control chassis for cost effective configuration of matrix sizes which exceed the limits of a single chassis. See the **MESA Bulletin** for details on building larger systems.

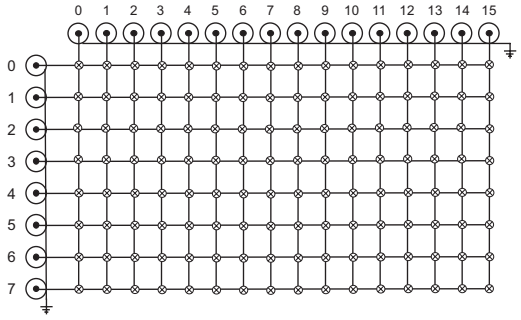


Fig. 1

CXB/16x8 Matrix Chassis

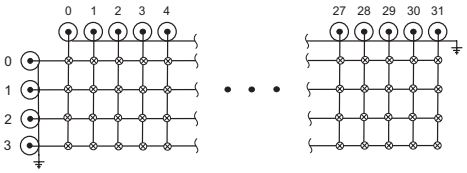
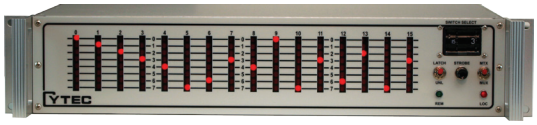


Fig. 2

CXB/32x4 Matrix Chassis



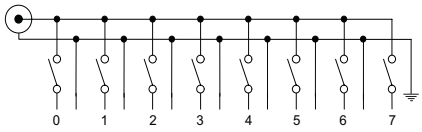
CXB/16x8 or 32x4 Matrix

CXB SWITCH MODULES

CXB/1x8-1S or -1M SWITCH MODULE

These modules are used with CXB/16x8 Chassis to provide Nx8 matrices. Each module supplies one connection in the N direction as shown in **Fig. 3**, and a total of 16 modules will form a 16x8 matrix. Each switch module requires one CL8 Display/Driver module.

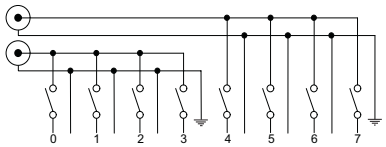
Fig. 3



CXB/2x4-1S or -1M SWITCH MODULE

These modules are used with CXB/32x4 Chassis to provide Nx4 matrices. Each module supplies two connections in the N direction as shown in **Fig. 4**, and a total of 16 modules will form a 32x4 matrix. Each switch module requires one CL8 Display/Driver module.

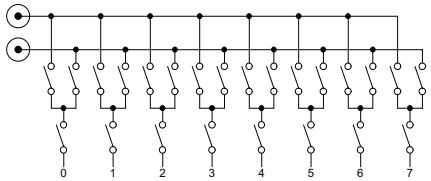
Fig. 4



CXE/32x8 MODULAR MATRIX

The CXE/32x8 Matrix uses CXE/2x8 Switch Modules to form modular systems in the same manner as the CXB systems shown above. Each switch module has 16 single pole coaxial relays configured as a 2x8 matrix with additional isolation relays as shown in Fig. 5. Installing up to 16 modules in the matrix chassis allows the formation of matrices up to 32x8 as shown in Fig. 6. Each CXE Switch Module requires one CLE/16 Display Module for control and LED display of selected relays. All remote control options are available. A fully populated CXE/32x8 has a bandpass of DC to 50 MHz (-3dB) with Isolation of -50 dB at 50 MHz. Inputs and outputs are fully bidirectional and use BNC connectors.

Fig. 5



CXE/2x8 Switch Module

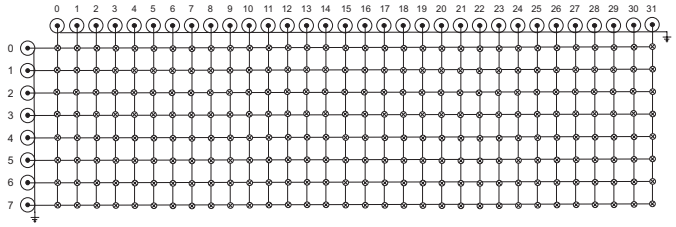


Fig. 6

CXE/32x8 Matrix

CXG SERIES DC to 700 MHz COAXIAL MATRIX

CYTEC's CXG Series of coaxial tree switch matrices are available as 4x8 or 8x8 nonblocking configurations in 50 or 75 ohm characteristic impedance. The tree switch topology shown in Fig. 7, provides excellent attenuation and crosstalk specifications from DC to 700 MHz. The use of electro-mechanical relays make these systems completely bidirectional and capable of hot switching signals up to 24 watts. 50 ohm systems are available with BNC, SMA or other user specified connectors. 75 ohm systems are available with BNC or SMB connectors. Any of CYTEC's standard control modules may be specified as well as the MC/2 Keypad manual control.

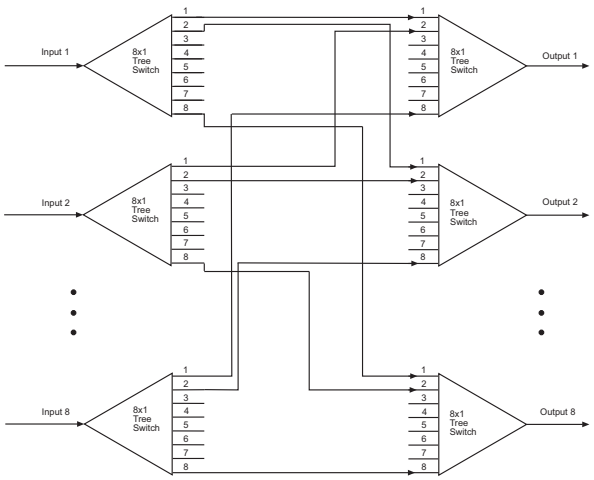


Fig. 7

SPECIFICATIONS

Bandpass(50 ohm)	**DC to 700 MHz (-3 dB)**
Bandpass(75 ohm)	**DC to 500 MHz (-3 dB)**
Isolation	**-60 dB to 700 MHz**
VSWR	**<1.4**
Impedance	**50 or 75 ohm**
Switched Power	**24 watts max**
Switch speed	**10 ms**
Signal Connections	**See below**
19" rackmount Size	**7" high, 15.6" deep**
Weight	**Approximately 25 lbs**

How to order:

CXG/ □x8-□□-□□□

4	50	BNC
8	75	SMA
		SMB

50 ohm systems BNC or SMA only
75 ohm systems BNC or SMB only

CXF SERIES FULL FANOUT 5-500MHz COAXIAL MATRIX

This system is a nonblocking (any input to any output), full fan out (any input to any or all outputs), 50 ohm coaxial switch matrix available in 4x8 or 8x8 configurations as shown in Fig. 8. Larger configurations can be supplied using multiple Expansion Chassis and a MESA Control Chassis. Systems are built with BNC or SMA as standard connectors. Other connector styles available on request. The matrix has LED visual display of latched switch paths and is available with any of the standard control modules.

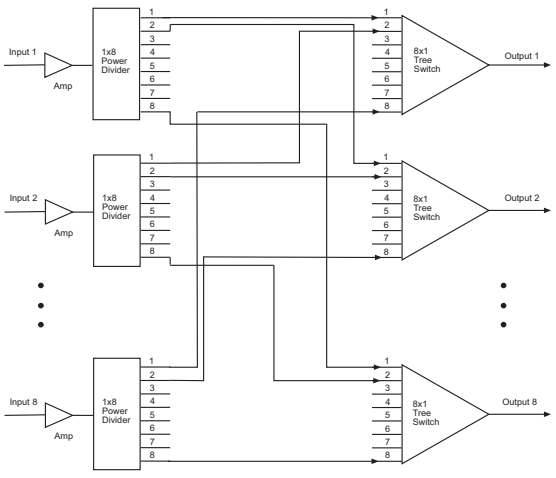


Fig. 8

SPECIFICATIONS

Bandpass	**5 MHz to 500 MHz (+/- 2 dB)**
Isolation	**-65 dB to 500 MHz**
VSWR	**<1.6:1 to 500 MHz**
Impedance	**50 ohm**
Switched Power	**+2.0 dBm**
Switch Speed	**10 ms**
Signal Connections	**SMA or BNC on rear panel**
19" Rackmount	**7" high, 15.6" deep**
Weight	**Approximately 25 lbs**

How to order:

CXF/ □x8-50-□□□

4	BNC
8	SMA

CXL SERIES 8x8 BLOCKING MATRIX

The CXL/8x8 blocking matrix is a compact and affordable, DC to 700 MHz coaxial 8x8, bidirectional matrix as shown in Fig. 9. The system will allow any input to be connected to any output but requires that the entire switch is reconfigured in order to establish a new path. This may cause a momentary disconnect in previously set paths when a new connection is desired.
The CXL/8x8 is an extremely cost effective solution for tests which are not reconfigured during the test run, or can tolerate momentary loss of signal during reconfiguration.

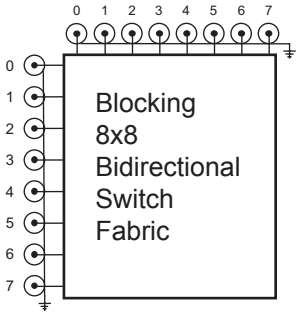


Fig. 9

SPECIFICATIONS

Bandpass	DC to 700 MHz (-3 dB)
Isolation	-60 dB to 700 MHz
VSWR	< 1.4 to 700 MHz
Impedance	50 ohms
Max Switched Power	24 Watts
Max Switched Current	1 Amp
Relay type	High frequency Armature
Connectors	BNC or SMA
Configuration set-up time	0.1 seconds
Chassis Dimensions	19" rackmount, 3.5" high, 15.6" deep
Weight	15 lbs
Power Consumption	< 50 Watts with all paths closed

RELAY SPECIFICATIONS

Three types of relays are used in CX Series Matrices:

Type S Reed Relay - This is a single pole Form A dry reed switch for low power applications.

Type M Reed Relay - This is a single pole Form A mercury wetted reed switch for higher power applications.

Type A Armature Relay - This is a single pole Form C armature relay for RF applications.

The **CXB Series** is available with either **Type S** or **Type M**.
The **CXE Series** uses **Type S** only.
The **CXG, CXF and CXL Series** all use **Type A** relays.

Reed relays are guaranteed for 100 million operations, and Armature relays are guaranteed for 1,000,000 operations if used within the following ratings:

	Type S	Type M	Type A
Contact Rating	10VA	50VA	24 Watts
Switch Voltage	200V	500V	24V
Switch Current	0.5A	2.0A	1A
Breakdown Voltage	400V	1000V	200V
Operating Time	1ms	2ms	10ms

GENERAL SPECIFICATIONS

WEIGHT - 30 lbs. max for full systems.
POWER - 100-130 VAC or 200-240 VAC 50-60 Hz
POWER CONSUMPTION - < 100 watts.
ENVIRONMENT - Operating at 0°C to 50°C.
Storage at -25°C to 65°C.

AVAILABILITY - Most systems available 30 days ARO.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Material and Workmanship for a period of 5 years and that all switches are guaranteed for their Rated Operations. A 10 year warranty/service agreement is available with the purchase of specified spare parts.

RAM OPTION

This option is available with the IF-5 Control Module and allows up to 100 Switch selections to be stored in memory. It also allows automatic reset to specific configurations on Power Up.

SOFTWARE

Drivers and Sample Programs are available for the most common programming languages. These check the entire system by cycling through all switches, sequentially latching and unlatching each switch while checking Status.

CONTACT: 1-800-346-3117 OR 585-381-4740 Web: cytec-ate.com
E-mail: sales@cytec-ate.com FOR TECHNICAL ASSISTANCE

CYTEC CORP.
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

VDX SERIES

VIDEO AND RF SWITCHING SYSTEMS

CYTEC's VDX Series of Video and RF Switching Systems are based on a solid state switch fabric and are available in nonblocking, full fan-out configurations of 16x16 and 32x32, with bandpass to 200 MHz. Input and output buffers can be added to the basic switch fabric allowing a broad range of both 75 and 50 ohm impedance signals to be switched. Control options include RS232 Serial, IEEE488 GPIB, TCP/IP 10BaseT LAN. A Manual Control Keypad option is available.

TYPICAL APPLICATIONS INCLUDE:

- **Programmable Routing of T3/DS3, Video or Low Level RF (Antenna Downlink, IF, etc).**
- **Broadcast Video to Multiple Locations.**
- **Signal Distribution for Communications and Test.**
- **Automated Patch Panels.**

VDX/32x32 Chassis w/ Keypad Manual Control

VDX CHASSIS

The VDX Chassis are standard 19" rack mount with either RS232 or IEEE488 Control and BNC Connectors. Any input to any or all outputs.

The following chassis are available:

VDX/16x16 Mainframe - 3.5" high and 15.6" depth 16x16 Matrix - (any input to any or all outputs)

VDX/32x32 Mainframe- 5.25" high and 15.6 " depth 32x32 Matrix (any input to any or all outputs)

VDX/32x32-E Expansion Chassis - is used for building larger systems. Multiple VDX Chassis can be controlled from one MESA Control Chassis shown in the **MESA Bulletin.**

CONTROL OPTIONS

IF-3P RS232 SERIAL

This Module has all the RS232 features detailed in Applications Bulletin AP-5.

IF-4P IEEE488 BUS (TALK/LISTEN)

This Module has all the IEEE488 features detailed in Applications Bulletin AP-5.

IF-6 TCP/IP LAN/RS232 INTERFACE

This Module uses TCP/IP to furnish control from a Local Area Network as described in AP-5

Please see the reverse side for complete Specifications.

VDX/16x16 MAINFRAME

This Chassis consists of a single ended Solid State 16x16 Matrix that routes 75 ohm signals up to 200 MHz in a nonblocking (any input to any output) and full fan-out (one input to several or all outputs) configuration. The basic unit holds the necessary power supplies and the switch matrix module. The system is completed by adding the desired control module and any required input or output buffers. The buffers are optional, and when used, supply impedance matching and/or signal level transformations. This design allows a large variety of signal types to be switched.

VDX/32x32 MAINFRAME

This Chassis is a nonblocking, full fan-out solid state matrix. **Crosstalk** is less than -60dB at 10MHz and **Bandpass** is DC to 180 MHz(-3 dB). Typical applications include 75 ohm Video or DS3/T3 Switching. Input and Outputs buffer amplifiers can be added to the basic switch fabric allowing a broad range of both 75 and 50 ohm impedance signals to be switched.

VDX/32x32-E EXPANSION CHASSIS

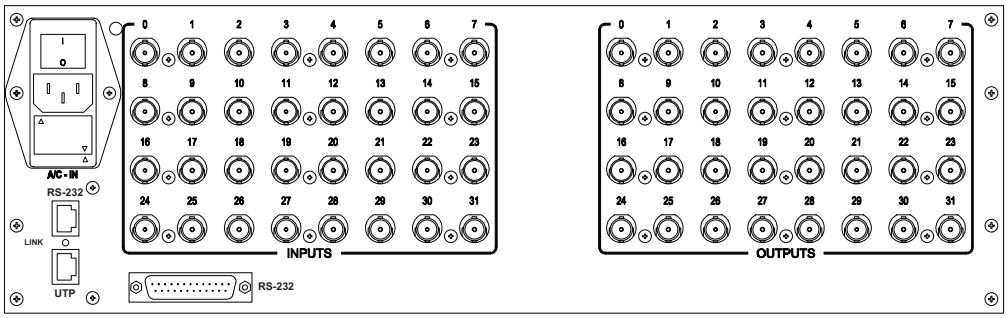
This Chassis has all the features of the VDX/32x32 Mainframe but is controlled and powered by a MESA Control Chassis as detailed in the **MESA Bulletin**.

Custom configurations are available on request. Please contact our Technical Sales Department for application assistance.

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

SPECIFICATIONS AND BUFFER OPTIONS

Fig. 2



VDX/32x32 Mainframe with RS232 and LAN Control and BNC Signal Connections

VDX SERIES MATRIX

The VDX Series is intended to switch small signal levels in a non-blocking (any input to any output), full fan out (any input to any or all outputs) configurations. The heart of the system is a solid state 32x32 switch fabric. When used without buffer amplifier modules, the system conforms to all of the specifications shown below. When used with input and/or output buffers, the specifications are determined by the buffer stages.

VDX SPECIFICATIONS (75 ohms, no buffers)

Connections	BNC Signal Connections, AC input and Remote Control input are on rear panel shown in **Fig.2**. Alternate signal connectors including SMA, SMB and SMC optionally available.

ENVIRONMENTAL

Operating Temperature	0° to 70° C
Storage Temperature	-25° to 80° C
Humidity	95% RH noncondensing to 30° C

POWER

AC Input	Selectable 100-130 or 200-240 Volts AC, 50-60 Hz.
DC Supply Type	Low Noise Linear
Consumption	150 Watts Maximum for 32x32 Matrix

BANDPASS

Small Signal Flatness	200 MHz (-3dB) for 200 mVpp 0.1dB at 60 MHz
Large Signal Flatness	80 MHz (-2dB) for 2.0 Vpp 0.1dB at 45 MHz
Slew Rate	0.375 V/ns

CROSSTALK / ISOLATION

Crosstalk	-50 dB at 5 MHz -60 dB at 10 MHz Non Adjacent -46 dB at 10 MHz Adjacent Channels
Isolation	-95 dB at 10 MHz

MISCELLANEOUS

Switching Speed	50 ns plus any computer delay
Characteristic Impedance	75 Ohms (unbuffered) 50 Ohms buffered

INPUT and OUTPUT BUFFERS

Optional Buffers are available for all Input and/or Output Channels. These buffers serve up to three different purposes:

1) They transform impedances to allow the solid state switch fabric to be used for systems with other than 75 ohms characteristic impedance.

2) Input Buffers can be used to reduce signals to levels where they can be safely switched by the matrix.

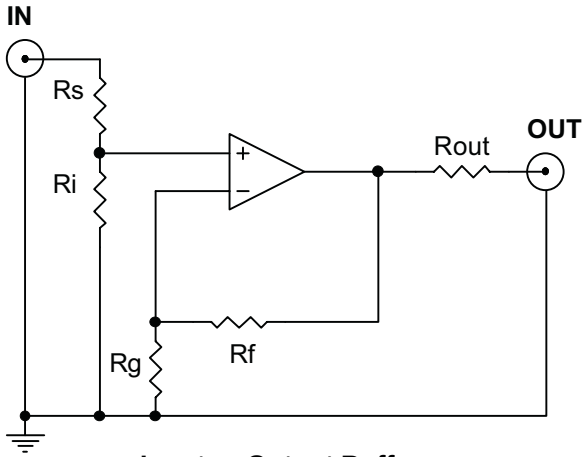
3) Output Buffers can have preset gains to boost signals to required voltages.

A typical buffer is shown schematically in **Fig. 3**. Resistors **Rs** and **Ri** set the input impedance and also attenuate the input signal (if needed), while **Rout** determines the output impedance. The circuit is typically built with one of several standard small signal Op Amps, but custom amplifiers are also possible. The specifications for a typical small signal amplifier are shown below.

BUFFER SPECIFICATIONS

Bandpass (-3dB)	175 MHz w/ Vout=2Vpp 165 MHz w/ Vout=5Vpp
Preset Gains (Av)	2 to 16
Output Current	70 mA typical
Rise Time	0.375 V/ns typical

Fig. 3



Input or Output Buffer

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Workmanship and Materials for a period of five years and that all switches are guaranteed for their Rated Operations.

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

VDM SERIES

SOLID STATE VIDEO, RF or BALANCED LINE SWITCHING SYSTEMS

CYTEC's VDM Series Switching Systems are based on a solid state switch fabric and are available in nonblocking, full fan-out configurations from 8x8 to 32x32, with a small signal bandpass to over 400 MHz. Input and output buffers are added to the basic switch fabric allowing a broad range of both 75 and 50 ohm coaxial or two wire signals to be switched. Control is via the new IF-8 Control Module, which supplies RS232, IEEE488, and Ethernet remote controls.

TYPICAL APPLICATIONS INCLUDE:

- **Programmable Routing of T3/DS3, Video or Low Level RF (Antenna Downlink, IF, etc).**
- **Broadcast Video to Multiple Locations.**
- **Signal Distribution for Communications and Test.**
- **Automated Patch Panels.**

VDM/32x32 Chassis w/ Keypad Manual Control

SYSTEM HIGHLIGHTS:

- **Modular Design - System can be configured in increments from 8x8 to 32x32 matrix sizes.**
- **Systems are designed for single ended 50 or 75 ohm coaxial as well as two wire pairs.**
- **Different Buffer Modules provide for impedance transformation (e.g., 50 to 75 ohms) and balanced to unbalanced signals.**
- **Input and Output Buffer Modules are hot-swappable.**
- **Control via IEEE488, RS232 & Ethernet all standard.**
- **Firmware upgrades can be downloaded from Cytec's web site.**

CONTROL OPTIONS

IF-8 IEEE488, RS232 & ETHERNET LAN

These controls are standard. All interfaces may be active and in use simultaneously. Setup information is stored in NVRAM, which also allows the system to be configured for various matrix addressing conbinations which are then remembered. The IF-8 may be removed without affecting the switch state. However, installing the IF-8 will cause the system to clear and reset.

MC-2 Keypad Manual Control

This optional front panel control includes a keypad and LCD Display. The operator can open, close and verify the status of any switch point.

VDM CHASSIS

The VDM Chassis are standard 19" rack mount with RS232, IEEE488 Control and Ethernet Controls. These sold state systems are nonblocking and full fanout. Any input connects to any or even all outputs. BNC Input and Output connectors are standard, while other connectors such as SMA or Twinax are also offered. Small signal bandpass is DC to over 400 MHz, while crosstalk is better than -60 dB at 50 MHz.

The following chassis are available:

VDM/32x32 Mainframe- 5.25" high and 15.6 " depth Configured from an 8x8 to 32x32 Matrix

VDM/32x32-E Expansion Chassis - is used to build larger systems. Multiple VDX Chassis can be controlled from one MESA II Control Chassis shown as in the **MESA Bulletin.**

ALL CHASSIS

Material: Gray anodized extruded or sheet aluminum
Mounting Hardware: Rack mount handles are standard Flush mount flanges available at no extra cost.
AC Power: Autoranges from 90 - 264 VAC at 47-63 Hz

Custom configurations are available on request. Please contact our Technical Sales Department for application assistance.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

SPECIFICATIONS AND BUFFER OPTIONS

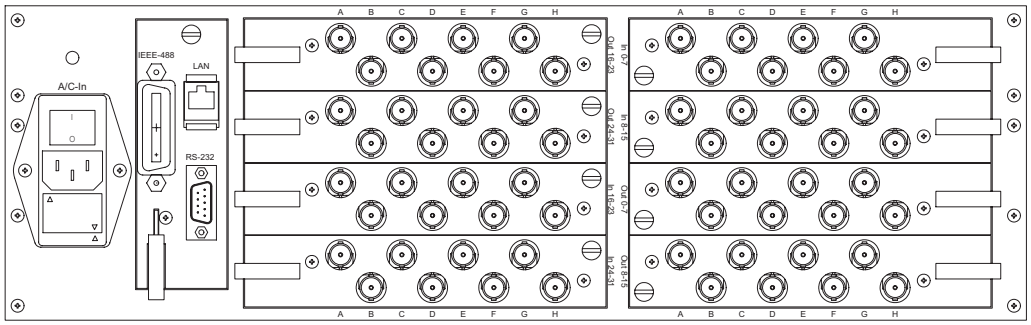


Fig. 1 VDM/32x32 Mainframe with RS232, IEEE488 and LAN Control, with BNC Signal Connections

VDX SERIES MATRIX

The VDM Series is intended to switch small signal levels in a nonblocking (any input to any output) and full fan out (any input to any or all outputs) configuration. The heart of the system is a solid state 32x32 switch fabric. The basic system holds the necessary control module, power supplies and the switch fabric The system is completed by adding the required input or output buffers. The buffers supply impedance matching and/or signal level transformations. This design provides switching for a large number of different signal types.

VDM SPECIFICATIONS

Connections

BNC Signal Connections, AC inputand Remote Control input are on rearpanel shown in **Fig.1**. Optional signal connectors including SMA, SMB, TwinBNC and Triax.

ENVIRONMENTAL

Dimensions	19' rack mount x 5.25" H x 15.6" D
Weight	20 lbs. max. with buffers installed
Operating Temperature	0° to 65° C
Storage Temperature	-25° to 80° C
Altitude, Operational	3,000 meters
Altitude, Storage	15,000 meters
Humidity	95% RH noncondensing to 30° C

POWER

AC Input	90-264 Volts AC, 47-63 Hz
DC Supply Type	High Efficiency Switching
Consumption	250 Watts Maximum for 32x32 Matrix

BANDPASS

Small Signal	Approx. 500 MHz (-3dB) for 0 dBm
Flatness	0.5 dB at 0 - 300 MHz
Slew Rate	1800 V/usec

CROSSTALK / ISOLATION

Crosstalk	-50 dB at 240 MHz
	-60 dB at 240 MHz Non Adjacent
Isolation	-40 dB at 360 MHz
	-50 dB at 360 MHz Non Adjacent

MISCELLANEOUS

Switching Speed	100 ns plus any computer delay

INPUT and OUTPUT BUFFERS

Optional very wideband Buffers are available for all Input and Output Channels. These buffers serve up to three different purposes:
1) They transform impedances to allow the solid state switch fabric to be used for signals requiring other than two wire analog, for example 50 ohm coax.
2) Input Buffers can be used to reduce signals to levels where they can be safely switched by the matrix.
3) Output Buffers can have preset gains to boost signals to required voltages.

A typical Output buffer is shown schematically in **Fig. 2**. Resistors **Rs** and **Ri** set the input impedance and also attenuate the input signal (if needed), while **Rout** determines the output impedance. The circuit is typically built with one of several standard small signal Op Amps, but custom amplifiers are also possible. Specifications for a typical small signal amplifier are shown below.

BUFFER SPECIFICATIONS

Bandpass (-3dB)	Typically>500 MHz
Preset Gains (Av)	2 to 16
Output Current	80 mA typical
Rise Time	3100 V/us typical

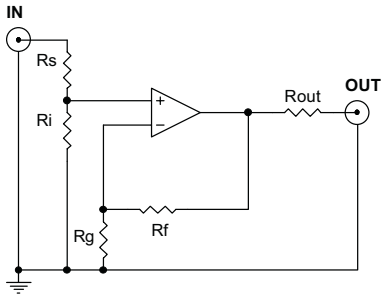


Fig. 2 Typical Output Buffer

SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

CYTEC CORP.

BULLETIN
TX-1

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

TX SERIES

THREE STAGE MATRIX SWITCHING SYSTEMS

CYTEC's TX Series Three Stage Matrix Switching System is completely non-blocking, full fan-out configurations from 16x16 to 128x128, with a bandpass to 140 MHz. The system can handle a wide variety of 50 and 75 ohm signals. Control options include RS232, IEEE488, LAN or LCD Keypad Manual Control.

TX/128X128 CHASSIS

The TX/128x128 Three Stage Matrix Mainframe is capable of being expanded from a 16x16 to a 128x128 by adding the desired number of input and output modules. The TX Series Matrix is completely non-blocking (all inputs can be connected to all outputs simultaneously) and full fan-out (any one input may be connected to any or all outputs without degrading the signal).

TX/128x128 MAINFRAME

The TX/128x128 standard 19" rack mounting units are built with power supplies, a Control Module and optional LCD Display Manual Control. The system is completely modular by adding the desired number of Input and Output Switch Modules.

TX/128x128-E EXPANSION CHASSIS

The expansion chassis is identical to the mainframe in size and function. The expansion chassis, however, is built without a dedicated control module, manual control or power supplies. Instead, it is designed to be both powered and controlled by one of CYTEC's MESA Control Chassis detailed in the **MESA Bulletin**. Ribbon Expansion Cables connect the expansion chassis to the MESA.

CUSTOM CHASSIS

Custom configurations are available upon request. Most custom systems wire out the rear panel Input/Output connections to a required connector type that is different from the standard SMB female connectors. This wiring is priced on the basis of labor and materials.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Material or Workmanship for a period of 5 years and that all switches are guaranteed for their rated operations as shown on the second page.

TX/64x64 Mainframe Rear View

CONTROL MODULES

IF-5 IEEE488/RS232 CONTROL MODULE

This module provides remote control via both RS232 Serial and IEEE488 Talk/Listen interfaces as detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This optional module allows control over a 10BaseT Ethernet Local Area Network via TCP/IP protocols as described in Applications Bulletin AP-5.

MANUAL CONTROL

MC-2 WITH LCD DISPLAY

This local control supplies a front panel Keypad and LCD Display that lets the operator control any switch and verify switch status.

VMCS

This Virtual Manual Control Software allows a remote operator using a PC to view matrix Status and control switches using a full Graphical User Interface.

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

SPECIFICATIONS AND BUFFER OPTIONS

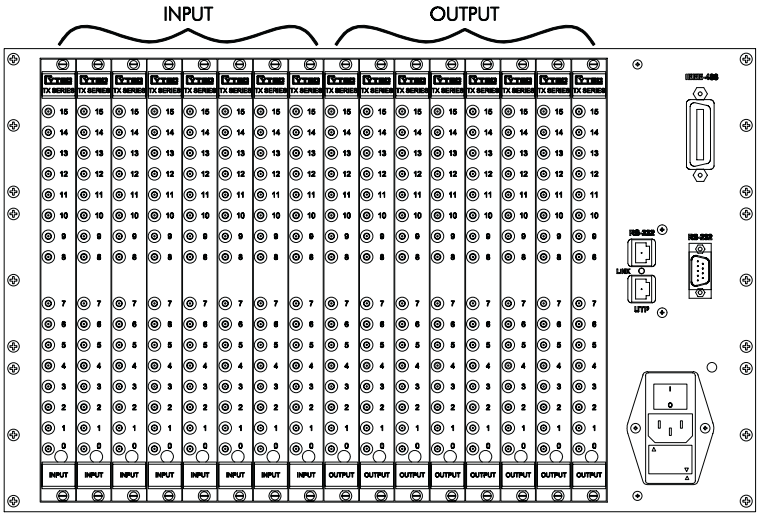


Fig. 2

TX/128x128 Mainframe Rear View with IEEE488, RS232 and LAN Control

TX SERIES MATRIX

The TX Series is intended to switch small signal levels in a non-blocking (any input to any output), full fan out (any input to any or all outputs) configurations. For a 128x128 non blocking three stage matrix mainly consist of an input, center and output stage. Each Input stage is a 8x16 matrix. Sixteen input stages gives you 16x8 = 128 input connectors. Each Center stage is a 16x16 Matrix. There are 16 intermediate stages. Each Output stage is a 16x8 Matrix. Sixteen outputs give you a 16x8 =128 output connectors.

TX SPECIFICATIONS (signal w/o buffers)

Characteristic Impedance:	75 Ohms
Small Signal Bandpass (±0.1 V)	140 MHz (-3dB)
Large Signal Bandpass (±1.0 V)	80 MHz (-3dB)
Crosstalk: non adjacent path	-75 dB @ 20 MHz
adjacent path	-47 dB @ 10 MHz
Input/ Output Isolation:	-80 dB @ 10 MHz
Switching Speed:	50 ns + Control Interface Delay

CONNECTIONS

Signal Connections:	SMB, Patch panels normally provided to convert SMB to BNC, SMA or customer specified connector.
AC Input:	Universal, US Standard AC
RS232:	D9 Male
GPIB:	IEEE488
10BaseT LAN:	RJ45
LAN to RS232:	RJ45

POWER

AC Input	Selectable 110 /220 Volt Input. 100 to 130 VAC / 200 to 240 VAC 110 VAC fused @ 3 amps 220 VAC fused @ 2 amps 50 to 60 Hz.
Consumption	200 Watts, 128x128 with ±4V buffers
DC Supply Type	Low Noise Linear

GENERAL SPECIFICATIONS

Dimensions	19" Rack Mount 10.5" tall (6U) and 20.5" deep
Weight	25 lbs +.7 lbs per input /output module Full 128x128 =36.2 lbs (16.5 Kg)
Operating Temperature	0° to 70° C
Storage Temperature	-25° to 80° C
Humidity	95% RH noncondensing to 30° C

INPUT and OUTPUT BUFFERS

Optional Buffers are available for all Input and/or Output Channels. These buffers serve up to three different purposes:

1) They transform impedances to allow the solid state switch fabric to be used for systems with other than 75 ohms characteristic impedance.

2) Input Buffers can be used to reduce signals to levels where they can be safely switched by the matrix.

3) Output Buffers can have preset gains to boost signals to required voltages.

A typical buffer is shown schematically in **Fig. 3**. Resistors **Rs** and **Ri** set the input impedance and also attenuate the input signal (if needed), while **Rout** determines the output impedance. The circuit is typically built with one of several standard small signal Op Amps, but custom amplifiers are also possible. The specifications for a typical small signal amplifier are shown below.

TX SPECIFICATIONS (signal with buffers)

Characteristic Impedance:	50 or 75 Ohms
Small Signal Bandpass (±1.0 V)	140 MHz (±1.5dB)
Large Signal Bandpass (±4.0 V)	75 MHz (-3dB)
Crosstalk: non adjacent path	-75 dB @ 20 MHz
adjacent path	-47 dB @ 10 MHz
Input/ Output Isolation:	-80 dB @ 10 MHz
Switching Speed:	50 ns + Control Interface Delay

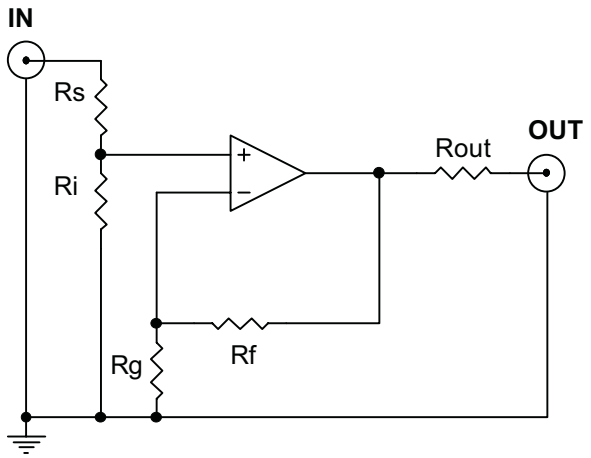


Fig. 3

Input or Output Buffer

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

RJ SERIES
SWITCHING SYSTEMS
FOR COMMUNICATIONS AND AUTOMATED TEST

The RJ Series of Computer Controlled Switching Systems are engineered for both analog and digital communication applications. A modular design is used, and different Control Modules, Switch Modules and Display Modules plug into prewired chassis, allowing systems to be tailored to fit specific applications. Connectors are RJ45, and up to 8 wires can be switched. Switchpoint Status Feedback is standard, and LED switch point Status Display is included with some models. Control options include: IEEE488 Bus (GPIB) / RS232, Ethernet LAN and Universal Serial Bus (USB). Manual Controls are also available.

The units are available as either Mainframes with built-in Control Modules and power supplies or as Expansion Chassis that are controlled and powered via a MESA Control Chassis. Please see the MESA Bulletin for more information.

10BaseT • 100BaseT • Gig-E (1000BaseT) • VOIP • POE • T1 • DSL • FireWire

This Bulletin Includes:

- **RJE Series** - **Multiplexers (up to 16 individual 1x4 or 1x5)**
- **RJF Series** - **Passive Fiber Optic Switches**
- **RJG Series** - **Gig-E Matrices or Multiplexers (8 wire)**
- **RJM Series** - **Modular Matrices (4 or 8 wire / 16x8 or 32x4)**
- **RJV Series** - **Matrices and Multiplexers (up to 144 channels)**

WARRANTY All CYTEC products are warranted against defects in workmanship and materials for a period of five years.

RJV SERIES - Matrices & Multiplexers (up to 144 channels)

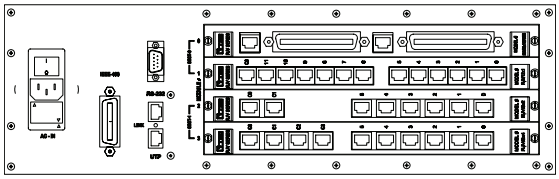
The RJV Series are high performance, bidirectional, passive Multiplexers or Matrices designed for demanding communication applications such as 100Base-T Network Switching. These units are built with high sensitivity Type A Armature Relays to insure low signal-to-signal crosstalk. Exceptional longitudinal balance and low insertion losses are achieved at high data rates. Connectors are CAT5 RJ45. A modularized design is used, and each Mainframe is built with integrated power supplies, a Control Module and a motherboard that holds the RJV Switch Modules. This results in a great deal of configuration flexibility.

RJV/48 Mainframe

This chassis is 5.25" high and accepts up to four RJV Series Switch Modules. The modules can be used individually, or bussed together in several different configurations (for example, as a 48x1 Mux). **Bandpass** is 100 MHz at -2dB and Near End Crosstalk between wire pairs **(NEXT)** is -42dB at 80 MHz, which exceeds 100Base-TX network specifications.

Dimensions:	19" rack mount (483 mm) 16" depth (396 mm) 3.5" (2 RU) height (89 mm)
Weight:	15 lbs (6.8 Kg) Max
AC Power:	50 Watts max (110/220 selectable)

RJV/48 Mainframe - Front View



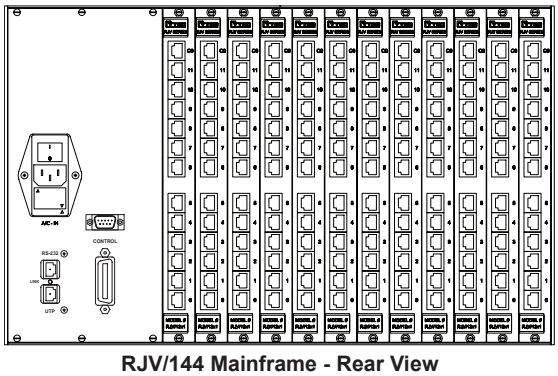
RJV/48 Mainframe - Rear View

RJV/144 Mainframe

This is a 19" rack mounting chassis, 10.5" high and 16" deep, designed to hold up to 12 RJV Series Switch Modules. Modules can be used individually or bussed together in several configurations. In all configurations, 100Base-TX **Bandpass** and **NEXT** specifications are met.

Dimensions:	19" rack mount (483 mm) 16" depth (396 mm) 3.5" (2 RU) height (89 mm)
Weight:	25 lbs (11.4 Kg) Max
AC Power:	100 Watts max (110/220 selectable)

RJV/144 Mainframe - Front View



RJV/144 Mainframe - Rear View

RJV/144-E Expansion Chassis

This is the same as the mainframe above but is powered and controlled via a MESA Control Chassis as detailed in the **MESA** Bulletin.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

RJV Switch Modules

Most RJV Switch Modules use high sensitivity, high isolation Type A Armature Relays and RJ45 connectors. Up to 8 poles are switched (but not on all models). Signals can be routed to the Common connectors on the individual modules or alternately to the motherboard bus. The bus interconnects the modules and creates larger multiplexers and matrices. The RJV / FOSM Fiber Optic Switch Modules are passive, bidirectional optical switches.

RJV/12x1-4, -8 Switch Module

Each module supplies a 12x1 Multiplexer as shown in **Fig. 1**. 4 or 8 pole versions are available. Four modules can be placed in the RJV/48 chassis to supply four (12x1), two (24x1), or one (48x1) Mux. In the RJV/144 chassis, one (144x1), two (72x1), four (36x1), or twelve (12x1) Muxes can be configured using 12 switch modules.

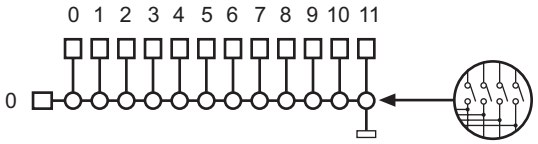


Fig. 1 Backplane Connection

RJV/4(1x2)-4, -8 Switch Module

Each module furnishes four individual 1x2 or "A/B" switches. 4 and 8 pole versions are available. Form C relays are used, meaning each of the four switches has a Normally Closed position. In an RJV/48, four modules will furnish 16 A/B Switches, and in the RJV/144, 12 modules will give 48 switches.

RJV/6x2-4 Switch Module

These modules switch four poles in a 6x2 Matrix configuration as shown in **Fig. 2**. They can be assembled in the RJV/48 as one (24x2), two (12x2) or four (6x2) Matrices. In the RJV/144 , one (72x2), two (36x2), four (18x2) or twelve (6x2) Matrices can be provided.

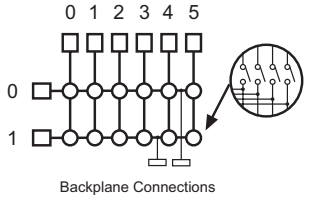


Fig. 2

RJV/4(1x2)-4, -8 Latching Switch Module

Much like the RJV/4(1x2) Modules shown above but with latching switch points. Latching modules maintain their current switched configuration.

RJV/6x4-4 Switch Module

These also switch four poles but are configured as a 6x4 Matrix as shown in **Fig. 3**. They can be assembled in the RJV/48 to create one (24x4), two (12x4) or four (6x4) Matrices, and in the RJV/144 to make one (72x4), two (36x4), four (18x4) or twelve (6x4) Matrices.

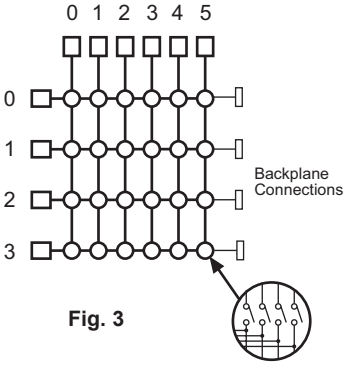


Fig. 3

Four Pole Versions of Switch Modules

RJV/FOSM Duplex (1x3) Latching Switch Module

Each module provides a passive fiberoptic switch in a dual 1x3 configuration as shown in **Fig. 4**. A 'moving fiber' design concept is used to achieve highly accurate and repeatable direct fiber to fiber connections. Both single and multimode versions are available. ST, SC or FC connectors are offered. As a latching design, this module will remain in its current switched state even if the power is turned off.

RJV/FOSM Duplex (2x2) Latching Switch Module

This passive fiberoptic switch is built as a dual 2x2 matrix. The same moving fiber design is used to assure highly accurate and repeatable fiber connections. Single and multimode versions are offered, along with ST, SC or FC connectors. This is also a latching module and it will retain its switched state when power is removed.

The RJV Switch Modules can be assembled in many different ways to provide a number of additional configurations. Contact our Applications Engineers to discuss your specific needs.

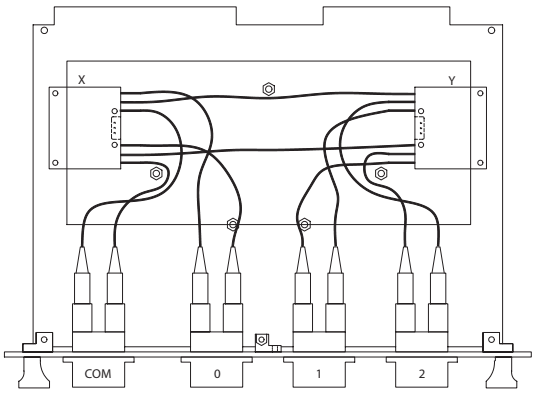
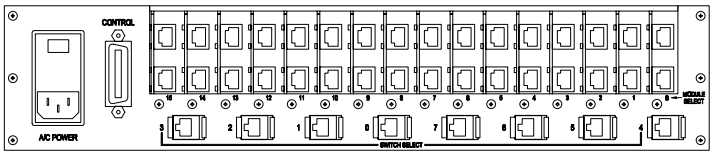


Fig. 4 - Duplex 1x3 Latching

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

RJM SERIES - MODULAR MATRICES (4 or 8 wire / 16x8 or 32x4)

The RJM Series are high Performance, bidirectional, passive Matrices and are designed to switch high speed communication signals, including T1, E1, DSL and 100Base-T Ethernet. High sensitivity Type A Armature Relays and RJ45 connectors are used to ensure high pair-to-pair isolation, and attenuation and crosstalk specifications are met. A modularized design is used, and each Mainframe is built with integrated power supplies, a Control Module and prewired Motherboards. CL8 Display Modules show switch point status. The RJM Switch Modules are available in versions switching 2, 4, 6 or 8 wires per the EIA/TIA 568 specification pairs.



RJM/16x8 Matrix - Rear View

RJM/128 MAINFRAMES

These are 19" rack mounting chassis, 3.5" high and 16" deep. Each Mainframe is assembled with power supplies and motherboards that hold one Control Module and up to 16 RJM Series Switch Modules. Signal connectors are RJ45 jacks. One CL8 Module is required for each Switch Module. Three different standard matrix configurations are offered:

RJM/2(16x4) MAINFRAME

This chassis holds up to 16 RJM/2(1x4) Switch Modules and forms two separate 16x4 matrices as shown in **Fig. 5**. Each matrix has a **Bandpass** of DC to 30 MHz (-3dB). **Crosstalk** between signal pairs is less than -60dB at 20 MHz.

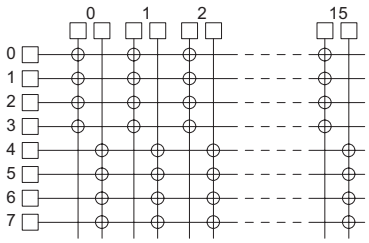


Fig. 5

RJM/16x8 Mainframe

This mainframe holds a maximum of 16 RJ/2(1x4) Switch Modules (each jumpered in a 1x8 configuration) to furnish a 16x8 Matrix. **Bandpass** is DC to 25 MHz and **Crosstalk** is less than -50dB at 20 MHz.

RJM/32x4 Mainframe

Bussing together the four output pairs (0A & 0B, 1A & 1B, etc) of the first two 16x4 matrices shown in **Fig. 5**, creates a single 32x4 matrix with a **Bandpass** from DC to 15 MHz and **Crosstalk** less than -45dB at 20MHz.

Dimensions:	19" rack mount (482.6 mm) 15" depth (381 mm) 3.5" (2 RU) height (89 mm)
Weight:	15 lbs (6.8 Kg) Max
AC Power:	10 Watts max (110/220 selectable)

RJM/2(1x4)-4,-8 SWITCH MODULES

These modules are built with high sensitivity two pole Type A Armature Relays which insures high isolation among signal pairs. Modules switching from 2 to 8 pins on RJ45 connectors are available and are defined by the corresponding part number suffix. Each two pole relay switches one pin pair on the RJ45 jacks as defined in the EIA/TIA 568 Specification - that is, Pins 1&2, 3&6, 4&5, 7&8. Built-in pin jumpers allow the switch module to be configured as a single 1x8 Matrix as shown in Fig. 6.

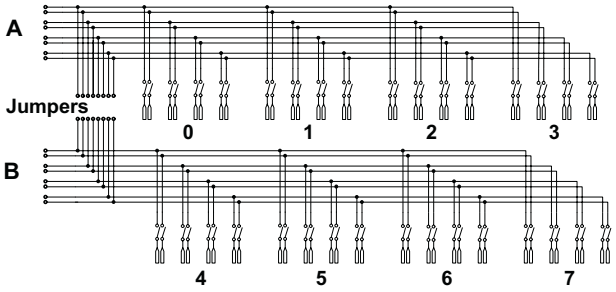


Fig. 6 RJM/2(1x4) Switch Module

CL8 DISPLAY MODULES

One Display Module is required for each RJM Switch Module. These control the switch module and have LEDs that show switch status.

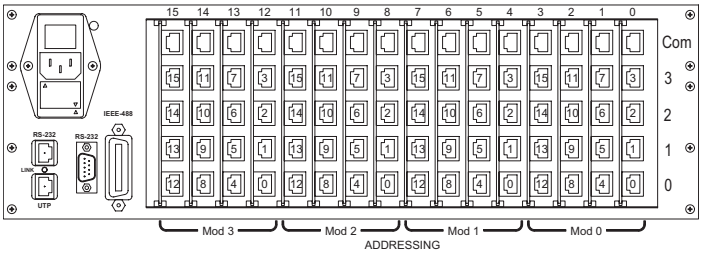
RJM/128 EXPANSION CHASSIS

These chassis are the same as the mainframes but are built without power supplies or a control module. They are controlled and powered by a MESA Control Chassis as detailed in the MESA Bulletin.

RJE SERIES - MULTIPLEXERS (up to 16 individual 1x4)

Each RJE chassis holds up to 16 of the RJE/ 4x1-8 Switch Modules as shown in the opposite figure. Each RJE/4x1-8 switches up to eight wires (as four pairs) on RJ45 connectors. These switch modules are designed for demanding high speed networking applications such as Gigabit Ethernet, ATM-155 and 100VG-AnyLan. The chassis is offered only in configurations of one to 16 individual 1x4s.

Dimensions:	19" rack mount (483 mm) 20" depth (508 mm) 5.25" (3U) height (133 mm)
Weight:	25 lbs (11.4 Kg) Max
AC Power:	50 Watts max (110/220 VAC selectable)



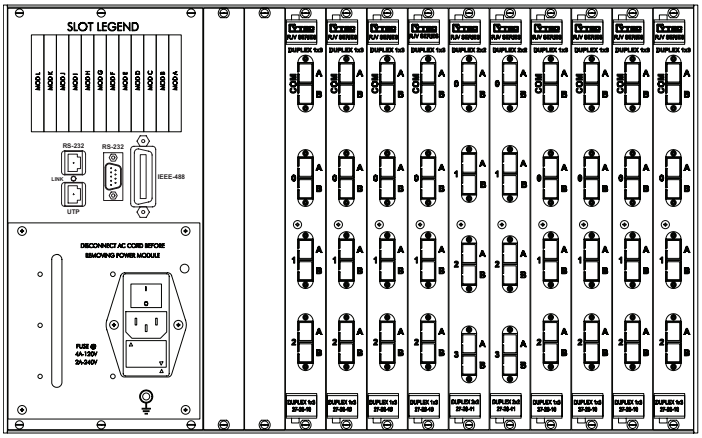
RJE Multiplexer - Rear View

Bandpass is DC to 350 MHz, while both **NEXT** and **FEXT** are 40 dB or better at 100 MHz.

RJF SERIES - Passive Fiber Optic Switches

FILLER -- This mainframe holds a maximum of 16 RJ/2(1x4) Switch Modules (each jumpered in a 1x8 configuration) to furnish a 16x8 Matrix. Bandpass is DC to 25 MHz and Crosstalk is less than -50dB at 20 MHz. This mainframe holds a maximum of 16 RJ/2(1x4) Switch Modules (each jumpered in a 1x8 configuration) to furnish a 16x8 Matrix. Bandpass is DC to 25 MHz and Crosstalk is less than -50dB at 20 MHz.

Dimensions:	19" rack mount (482.6 mm) 15" depth (381 mm) 3.5" (2 RU) height (89 mm)
Weight:	15 lbs (6.8 Kg) Max
AC Power:	10 Watts max (110/220 selectable)

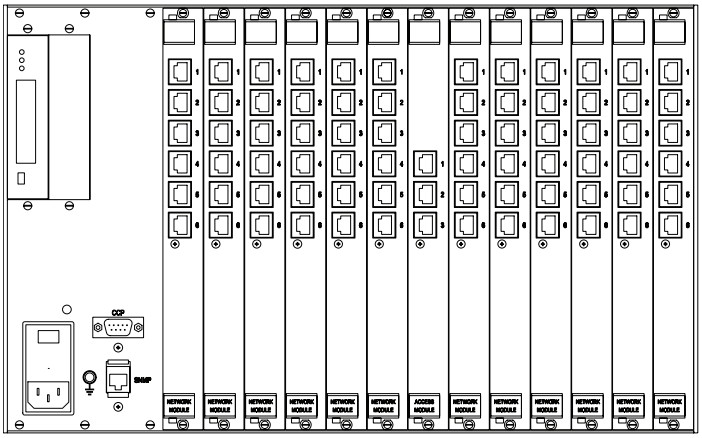


RJF Passive Fiber Optic Switch - Rear View

RJG SERIES - Gig-E Matrices or Multiplexers (8 wire)

The RJG Series of Gigabit Ethernet Switches holds 12 of the RJE Series Switch Modules along with a single *Switched* Signal/IO Module. The motherboard bus is divided into four separate segments, which minimizes stub length and capacitive loading effects. The Signal I/O Module switches to route the required motherboard segment to the chassis outputs.

Dimensions:	19" rack mount (482.6 mm) 15" depth (381 mm) 3.5" (2 RU) height (89 mm)
Weight:	15 lbs (6.8 Kg) Max
AC Power:	10 Watts max (110/220 selectable)



RJG Gigabit Ethernet Switch - Rear View

Controls

The RJ Series Mainframes are computer controlled via: IEEE488 BUS, RS232 Serial, Ethernet LAN, Universal Serial Bus (USB) or TTL Parallel Port. The Control Module selects any Mainframe switch point and is able to Latch, Unlatch and Request Status of the switch in both Matrix and Multiplex Modes.
In the Matrix Mode, any number of switches can be closed at the same time. In the Multiplex Mode, only one switch can be closed at a time.

RJE/RJM Control Modules

IF-5 IEEE488/RS232

This module combines both the IEEE488 BUS and RS232 features detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFAC E

This module allows control via a Local Area Network using TCP/IP protocols detailed in the AP-5 Bulletin.

IF-7 Combined USB/RS232

This control module is plug-and-play compatible with Universal Serial Bus and furnishes dual controls via both RS232 and USB, allowing users to switch to USB control as COM ports become obsolete on new computers.

M/128 Manual Controls

Thumbwheels and switches on the front panel select and control up to 128 relays.

Additional Manual Control Options

The following Manual Control Options are available for ALL chassis mentioned in this Bulletin. Contact our Technical Sales Representatives for more details and information.

CYTEC SWITCH MANAGER SOFTWARE

The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager free of charge from our website.

Available for Windows, Linux, Mac OS, or any other Java enabled platform

SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

RJF/RJG/RJV SERIES Controls

IF-6 LAN INTERFACE

This module allows control via a Local Area Network using TCP/IP protocols detailed in the AP-5 Bulletin.

IF-7 Combined USB/RS232

This control module is plug-and-play compatible with Universal Serial Bus and furnishes dual controls via both RS232 and USB, allowing users to switch to USB control as COM ports become obsolete on new computers.

MC/2 Manual Control - RJV ONLY

This Manual Control Option has a Keypad and LCD Display on the front panel so that the operator can select any relay and verify that the relay has been selected via the display. It is **only** available for the **RJV** Series.

Switch Specifications

SPECIFICATION	TYPE A
Contact Rating VA	30
Switching Voltage DC	110V
Switching Current DC	1.0 A
Carrying Current DC	1.0A
Breakdown Voltage DC	750V
Operate Time msec	3

The RJM Matrices and RJV Multiplexers are built with high sensitivity Type A Armature relays. pole versions only.

All Chassis

Material:	Gray Anodized extruded or sheet aluminum with a polycarbonate front panel overlay.
Mounting Hardware:	Rack mount handles are standard. Flush mount flanges available at no cost.
Protection:	Selectable AC input fused at: 2 amps 110 VAC, 1 amp 220 VAC.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

YTEC CORP.

BULLETIN
RS-4

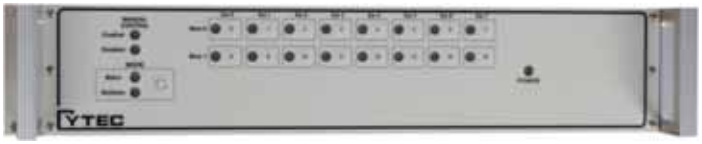
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

RS SERIES SWITCHING SYSTEMS

FOR AUTOMATIC TEST AND COMMUNICATIONS

The RS Series of computer controlled switching systems are designed to switch multiwire groups of signals of up to 25 wires. These systems are typically used for signals such as parallel TTL, RS232, RS422, WAN or Modems, but they can also be used for any group of analog or digital signals having a bandpass up to 30 MHz or data rate up to 20 Mbps. A modular design concept is used that provides configuration flexibility by allowing display modules, different control modules and switch modules to be assembled in one chassis.

LED displays and switch point Status Feedback are available on most systems. Computer control via IEEE488 (GPIB) and RS232 is standard, while TCP/IP Ethernet LAN, USB and manual controls are optionally available.



RS/16 Mainframe

RSM/8x8 Mainframe

There are three basic Series: (1) RS, (2) RSS and (3) RSM.

The RS Series are passive, bidirectional relay-based Multiplexers, connecting one of up to 16 multiwire signal groups to a single signal common. Nine, fifteen or twenty-five wires are switched simultaneously.

The RSS Series are solid state, nonblocking, full fan-out matrices for single wire or differential pair signals. Any input can be connected to one, several or all outputs.

The RSM Series are bidirectional, non blocking relay matrices. A modular design allows the configuration of matrices from 1x8 or 2x4 up to 16x8 or 32x4. Nine, fifteen or twenty-five wires are switched together.

RS MULTIPLEXERS

These pre-wired chassis hold RS Switch Modules built with D9, D15 or D25 style connectors and switch 9, 15 or 25 wires.

RS/16 Mainframe accepts up to 16 of the RS Modules as a 16x1 Multiplexer.

RS/16-E Expansion Chassis may be used with a MESA controller to build multiple chassis multiplexers up to 256x1, depending on bandpass restrictions.

RSS MATRIX

This is made up of 16x8 Solid State Modules plugged into prewired RSS Chassis. Each chassis holds up to 16 modules. The following Switch Modules are supplied:

RSS/16x8-A switches ± 5 volt analog signals.

RSS/16x8-422 is used for differential RS422 signals.

RSS/16x8-TTL has TTL inputs and outputs.

RSS EXPANSION CHASSIS

These are built similar to the Mainframes except they are not built with control modules or power supplies. They are controlled and powered from a MESA Chassis as described in the **MESA Bulletin.**

RSM MATRICES

These are pre-wired chassis in the requested Matrix configurations. They hold up to 16 of the RSM Switch Modules. Switch Modules are available that switch either 9, 15 or 25 wires to D9, D15 or D25 connectors.

RSM MAINFRAMES

RSM/16x8 Mainframe holds 16 of the RSM/1x8 Switch Modules in a 16x8 Matrix configuration.

RSM/32x4 Mainframe holds 16 of the RSM/2(1x4) Switch Modules in a 32x4 Matrix configuration.

RSM/2(16x4) Mainframe holds 16 of the RSM/2(1x4) Switch Modules as two separate 16x4 Matrix configurations

RSM EXPANSION CHASSIS

These are similar to the Mainframes except they are not built with control modules. They are controlled from a MESA Chassis as described in the **MESA Bulletin.**

RSM SWITCH MODULES

These Switch Modules are available in two basic configurations, switching either 9, 15 or 25 wires to D9, D15 or D25 connectors.

RSM/2(1x4) Module has two separate 1x4 multiwire matrix configurations.

RSM/1x8 Module has one 1x8 multiwire matrix configuration.

RS MULTIPLEXER

These are passive, relay-based multiplexers switching from 9 to 25 wire signals such as RS232, RS422 or TTL in applications including Modems, Printers or Token Ring.

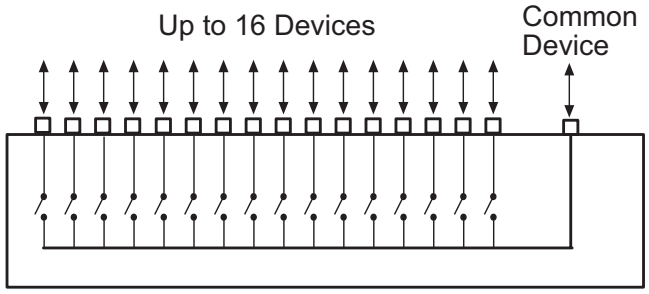
Their Bandpass is DC to 20 MHz.

RS/16 MAINFRAME

These are 19" rack mounted units 3.5" high and 15.6" deep with power supplies, LED Displays and pre-wired motherboards which accept the RS Switch Modules. This unit holds up to sixteen RS Switch Modules and has sixteen switchpoint status LEDs on the front panel. It can switch up to 25 wires from sixteen input ports to one output port, or the reverse, as shown in **Figure 1**.

EXPANSION CHASSIS

These are built similar to the Mainframes except they are not built with control modules or power supplies. They are powered and controlled from a MESA Chassis as described in the **MESA Bulletin**.



Bi-directional Switching from 9 to 25 wires

Figure 1

RS SWITCH MODULES

The RS/9, RS/15 and RS/25 Modules are built with Type A relays, switching 9, 15 and 25 poles. Connector types are subminiature D9, D15 or D25, and either -P pins or -S sockets can be user specified.

RS/9 SWITCH MODULE

This module is built with a D9 connector and Type A relays and switches nine wires.

RS/15 SWITCH MODULE

This module has a D15 connector with Type A relays switching all fifteen wires.

RS/25 SWITCH MODULE

This module utilizes a D25 connector and Type A relays switching all twenty-five wires.

PLUG or SOCKET D TYPE CONNECTORS

To specify Plug (male) D type connectors, add -P to the Switch Module part number. Adding -S specifies Socket (female) connectors. For example, the RS/15-S is built with a subminiature D15 Socket connector.

AVAILABLE MATING CONNECTORS

The following mating connectors can be purchased for a small additional charge.

D9-R - Nine pin ribbon cable connector
D9-C - Nine pin crimp type connector
D15-R - Fifteen pin ribbon cable connector
D15-C - Fifteen pin crimp type connector
D25-R - Twenty-five pin ribbon cable connector
D25-C - Twenty-five pin crimp type connector

RSS MATRIX

These are built up from the RSS/16x8 Solid State Modules, which in turn are plugged into pre-wired RSS chassis. Each module is an individual 16x8 Matrix, and multiple modules can be interconnected to form larger matrix configurations.

RSS/256 MAINFRAME

This is a 19" rack mounted chassis, 5.25" high and 15.6" deep, pre-wired to accept the RSS Series of Switch Modules. The unit has one slot that holds the required control module, as well as slots for up to sixteen RSS/16x8 Switch Modules. Multiple switch modules can be combined to form larger matrices.

EXPANSION CHASSIS

Expansion Chassis are built similar to the Mainframes except they are not built with control modules or power supplies. They are powered and controlled from a MESA Chassis as described in the **MESA Bulletin**.

RSS/16x8 SOLID STATE MODULES

This is a solid state switch module and it is configured as a 16 by 8 (16x8) matrix. Three separate versions are built to handle either analog, TTL or RS422 signals. The 16 inputs are wired to a 34 pin header, the 8 outputs to a 20 pin header. The module is full fan out so any input can be connected to one, several or all outputs.

RSS/16x8-A SWITCH MODULE

This module switches +/-5 volt analog signals and has a typical ON resistance of 60 ohms. Bandpass is 50 MHz when terminated into 1K ohms. It can be used as a 16x8 or 8x16 matrix.

RSS/16x8-422 SWITCH MODULE

Switches sixteen individual, two wire RS422 signal inputs to 8, two-wire RS422 outputs as shown in **Fig. 2** at up to 10 Mbps. Any input can be connected to one, several or even all outputs.

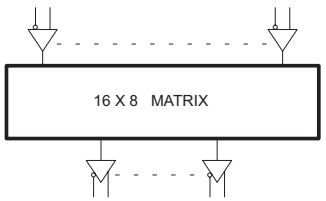


Fig. 2

RSS/16x8 TTL SWITCH MODULE

This module switches TTL level signals and can be used as either a 16x8 or 8x16 matrix. Any input can be connected to any or all outputs.

CUSTOM SWITCH MODULES

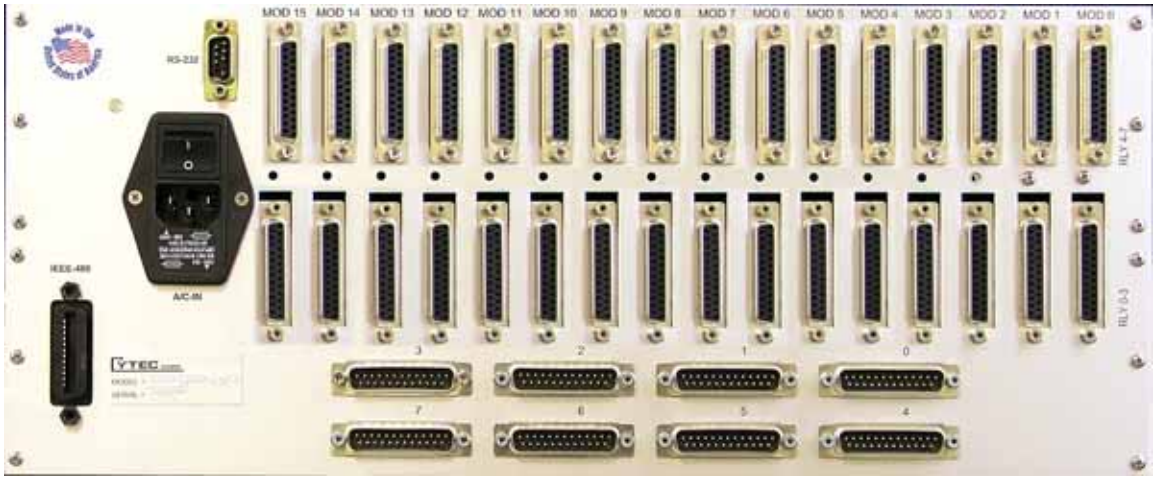
Switch Modules can be supplied that switch different types of input and output signals on the same module. For example, one module might have 16 two wire RS422 inputs switched into eight single wire TTL outputs.

MATING CONNECTORS

J20-R - Twenty pin ribbon cable type header connector
J20-C - Twenty pin crimp type header connector
J34-R - Thirty-four pin ribbon cable type header connector
J34-C - Thirty-four pin crimp type header connector

RSM MATRICES

RSM Matrices are designed to switch multiwire data communications signals such as RS232, RS422 and Token Ring. RSM Systems can switch 9, 15 or 25 wires and are available with D9, D15 or D25 style connectors.



MAINFRAMES

Mainframes are 19" rack mounted chassis, 7" (4U) high and 21" deep, with power supplies and pre-wired motherboards that hold Switch Modules, LED Display Modules and Control Modules.

RSM/16x8 SERIES

These Mainframes hold up to 16 of the RSM/1x8 Switch Modules assembled in a 16x8 configuration.
Bandpass is DC to 40 MHz (-3dB).
RSM/16x8-25 chassis holds the RSM/1x8-25 Modules, switching 25 wires from D25 connectors.
RSM/16x8-15 chassis accepts the RSM/1x8-15 Modules and switches 15 wires on D15 connectors.
RSM/16x8-9 chassis holds the RSM/1x8-9 Modules, switching 9 wires to D9 connectors.

RSM/32x4 SERIES

These Mainframes are built with up to 16 of the RSM/2(1x4) Switch Modules assembled in a 32x4 configuration.
Bandpass is DC to 30 MHz (-3dB).
RSM/32x4-25 chassis accepts the RSM/2(1x4)-25 Modules, switching up to 25 wires to D25 connectors.
RSM/32x4-15 chassis holds the RSM/2(1x4)-15 Modules and switches up to 15 wires from D15 connectors.
RSM/32x4-9 is built with the RSM/2(1x4)-9 Modules, switching up to 9 wires on D9 connectors.

RSM/2(16x4) SERIES

These Mainframes hold up to 16 of the RSM/2(1x4) Switch Modules assembled as a dual 16x4 configuration.
Bandpass is DC to 40 MHz (-3dB).
RSM/2(16x4)-25 chassis accepts the RSM/2(1x4)-25 Modules, switching up to 25 wires with D25 connectors.
RSM/2(16x4)-15 chassis is built the RSM/2(1x4)-15 Modules switching up to 15 wires to D15 connectors.
RSM/2(16x4)-9 chassis holds the RSM/2(1x4)-9 Modules switching, up to 9 wires to D9 connectors.

EXPANSION CHASSIS

Expansion Chassis are built similar to the Mainframes except they are not built with control modules. They are controlled from a MESA Chassis as described in the MESA Bulletin.

SWITCH MODULES

The RSM Switch Modules are built as either a single 1x8 matrix, or as a dual 1x4 matrix configuration. They are bidirectional and switch 9, 15 or 25 wires to D9, D15 or D25 connectors. Switching is done with high reliability, passive Type A Relays.

RSM/1X8 SWITCH MODULES

These utilize a 1x8 configuration as shown in **Fig. 3**.

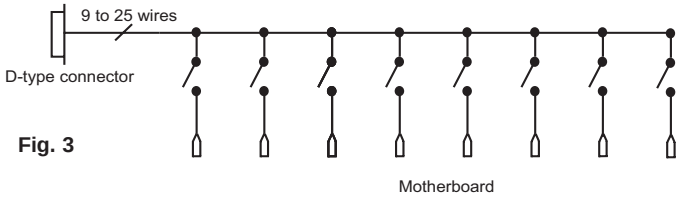


Fig. 3

RSM/1x8-25 switches 25 wires from D25 connectors and are used with the RSM/16x8-25 Chassis
RSM/1x8-15 switches 15 wires using D15 connects and are assembled in the RSM/16x8-15 Chassis.
RSM/1x8-9 switches 9 wires using D9 connectors and plug into the RSM/16x8-9 Chassis.

RSM/2(1X4) SWITCH MODULES

These modules are built as a dual 1x4 configuration as shown in **Fig. 4** :

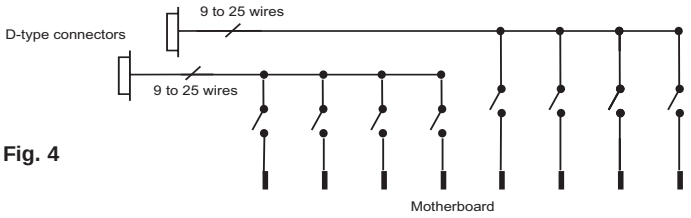


Fig. 4

RSM/2(1x4)-25 switches 25 wires using D25 connectors in either the RSM/32x4 or RSM/2(16x4) Chassis.
RSM/2(1x4)-15 switches 15 wires from D15 connectors and are used in the RSM/32x4 or RSM/2(16x4) Chassis.
RSM/2(1x4)-9 switches 9 wires using D9 connectors in the RSM/32x4 or RSM/2(16x4) Chassis.

CONTROLS

The RS Series of computer controlled Mainframes are available with the following controls: combined IEEE488/RS232 (standard), or optional Parallel Port TTL, Ethernet LAN or USB. The controls select any switch and can Latch, Unlatch and request Status of the switch using either Matrix or Multiplex Modes. In the Matrix Mode, any number of switches can be Latched as required. In the Multiplex Mode, only one switch can be Latched at any time; any previously latched switches are cleared.

RS MULTIPLEXER CONTROLS

IF-1 PARALLEL PORT

TTL compatible inputs select and Switch and Mode, Strobe the selection and also return Status.

IF-5 IEEE488/RS232 COMBINED CONTROL

This module provides control via both IEEE488 and RS232 and has all the features detailed in Applications Bulletin AP-5.

IF-6 ETHERNET LAN INTERFACE

This module interfaces between the Local Area Network and the RS232 controls using TCP/IP protocols as detailed in Applications Bulletin AP-5.

IF-7 EXTERNAL USB/RS232 INTERFACE

This external cable plugs into a USB port on the controlling computer and the Cytec Mainframe's RS232 Port. Permits control via USB at up to 19,200 bps.

PB/16 MANUAL CONTROLS

Optional pushbutton switches on the front panel can select and control up to 16 switch points when used with the IF-5, IF-6 and IF-7 Controls.

RSS MATRIX CONTROLS

IF-J5 IEEE488/RS232 COMBINED

This module controls up to sixteen RSS/16x8 Solid State Switch Modules with both the RS232 and IEEE488 features detailed in Applications Bulletin AP-5 with the exception that Status Return is not available.

IF-6 EXTERNAL LAN INTERFACE

This module interfaces between the Local Area Network and the RS232 Controls using TCP/IP protocols as detailed in Applications Bulletin AP-5.

IF-7 EXTERNAL USB/RS232 INTERFACE

This external cable plugs into a USB port on the controlling computer at one end and the Cytec Mainframe's RS232 Port on the other. Allows control via USB at up to 19,200 bps.

MC-2 MANUAL CONTROL

This manual control provides a front panel keypad and display which selects any switch and confirms the command operation.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in workmanship and materials for a period of 5 years. Relays are guaranteed for their rated operations when used within their published voltage, current and power specifications.

CUSTOM OPTIONS

Many CYTEC Switching Systems are available with custom configurations, connectors or controls. Please contact Cytec with your specific needs.

RSM MATRIX CONTROLS

CL8 DISPLAY/DRIVER MODULE

One CL8 Module is required for each RSM Switch Module. This module decodes logic and drives the Switch Module relays. A discrete LED, visible through the front panel, is wired to each drive, providing confirmation of all latched switchpoints. The LEDs are an extremely valuable aid in debugging and troubleshooting.

IF-1 PARALLEL PORT

TTL compatible inputs select any Switch and Mode, Strobe the selection and also return Status.

IF-5 IEEE488/RS232 COMBINED CONTROL

This module furnishes both the IEEE488 and RS232 control features detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This module interfaces between the Local Area Network and the RS232 Controls using TCP/IP commands as detailed in Applications Bulletin AP-5.

IF-7 EXTERNAL USB/RS232 INTERFACE

This external cable plugs into a USB port on the controlling computer and the Cytec Mainframe's RS232 Port. Permits control via USB at up to 19,200 bps.

MC-2 MANUAL CONTROL

This manual control provides a front panel keypad and display that selects any switch and confirms the command operation.

SPECIFICATIONS

GENERAL SPECIFICATIONS

WEIGHT - Maximum weight with full complement of Modules in the RSM/16x8 is less than 50 lbs. All other units are less than 25 lbs.

POWER - 100 watts at 100-130 Volts AC or 200-260 Volts AC.

ENVIRONMENT - Operating $0^0$to 50^0C
Storage -25^0C to 65^0C

SWITCH SPECIFICATIONS

Type S Standard dry reed relays are for general purpose instrumentation level signals. These have a life of 100 million operations when utilized within the specified signal ratings.

Type A relays are sensitive, high reliability armature relays and are well suited for multiple wire data signals. They are rated for 10 million operations when used as specified.

SPECIFICATION	TYPE A	TYPE S
Contact Rating VA	30	10
Switching Voltage DC	110V	200V
Switching Current DC	1.0A	.5A
Carrying Current DC	1.0A	1.0A
Breakdown Voltage DC	750V	400V
Operate Time mSec	3	1

CONTACT 1-800-346-3117 or WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

2555 Baird Road, Penfield, New York 14526 • cytec-ate.com • (800)346-3117 • (585)381-4740

HXV SERIES
HIGH VOLTAGE SWITCHING SYSTEMS

The HXV Series are computer controlled switching systems designed for High Voltage applications. Standard systems handle signals up to 5000 volts, while custom systems switching up to 40 kV are possible. Typically applications include Hi-pot and high voltage IR testing.

HXV/128 Mainframe with keypad manual control

FEATURES:

- **Standard relays hot switch up to 3500 volts or 3 amps, carry 5000 volts and 5 amps.**
- **Customized systems switch up to 40 kV.**
- **Front panel LEDs show switch status and aid in debugging.**
- **Computer Control via Ethernet LAN, combined IEEE488/RS232 Serial or TTL.**
- **Remote Status feedback to controlling computer.**
- **Manual Control option for use without computer control.**

CHASSIS:

The **HXV** Units are 19" rack mounted chassis, and are available as either mainframes or expansion chassis that are pre-wired to accept any of the HXV Series high voltage switch modules. All chassis have front panel LEDs showing open and closed switch points. Signal I/O connectors protrude through the rear panel.

HXV/32 Mainframe or -E Expansion Chassis -- 32 relay drives allow four HXV/8x1 or HXV/4x2 modules to be installed, or two HXV/8K modules. The chassis height is 5.25".

HXV/96 Mainframe or -E Expansion Chassis -- furnishes 96 relay drivers, controlling up to 12 HXV/8x1 or HXV/4x2 modules, or six HXV/8K Switch Modules in a 7" high chassis.

HXV/128 Mainframe or -E Expansion Chassis -- Up to 128 relay drives. Controls up to 16 HXV/8x1 or HXV/4x2 modules, or eight HXV/8K modules in a 10.5" high chassis.

Expansion Chassis - Up to 16 expansion chassis are run from a single Mesa Controller, allowing systems with up to 8096 switch points to be built. HXV chassis can be mixed with other Cytec products to provide a complete turn-key switching solution.

SWITCH MODULES:

HXV/8x1 Modules -- Individual modules can be wired together to build larger 1xN multiplexer configurations. Interconnects are located either externally or inside the chassis using screw terminal connectors built into the switch modules.

HXV/4x2 Modules -- Are used to build 2xN matrices. Useful for HiPot testing and Insulation Resistance testing where Hi and Low must be switched between any two of many measuring points.

HXV/8K Modules --- Furnish 8 SPST discrete relays which can be externally interconnected to form various configurations.

HXV CHASSIS

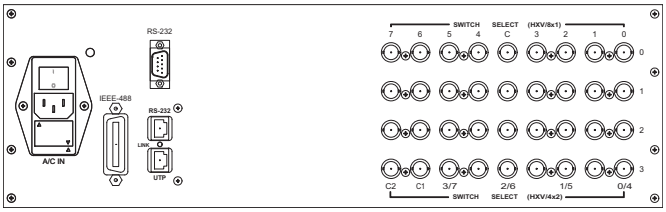
The HXV Chassis are 19" rack mounting units with built-in power supplies that are pre-wired to hold the HXV Series switch modules. Switch modules are mounted so that their I/O connectors protrude through the rear panel. Every chassis front panel has discrete LEDs showing the status of all switch points and also holds the optional manual control.

HXV/32 MAINFRAME OR -E EXPANSION CHASSIS

This chassis controls 32 switch points. A number of different switching configurations are possible. Add the required switch module(s) and a control module to complete the system.

Dimensions: 19" rack mount (483 mm)
15" deep (381 mm)
5.25" (2 RU) high (89 mm)
Weight: 20 lbs (9 Kg) max
AC Power : 75 watts max. 110/220 selectable.

HXV/32 with pushbutton manual control option

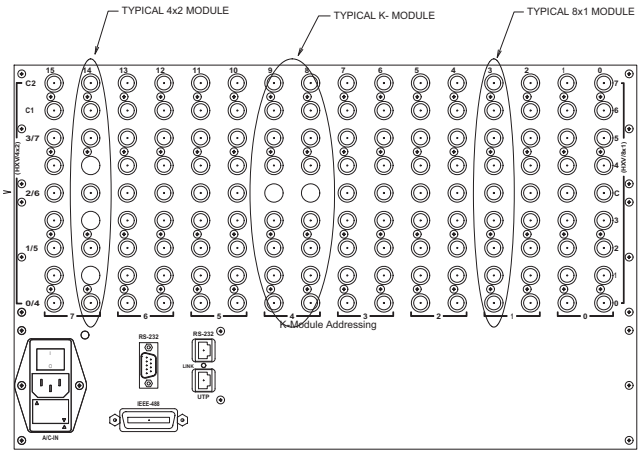


HXV/128 MAINFRAME

This chassis controls 128 switch points in a variety of different possible configurations. CL8 Display/Driver Modules drive the associated switch modules and have built-in LEDs showing switch status. The LEDs are visible thru the front panel. Add switch modules, CL8s, a control module and the optional manual control to complete the system. Standard chassis measure 15.6" deep and 10.5" high. Purchasing a larger than required mainframe, only partially filled, allows for cost-effective future expansion.

Dimensions: 19" rack mount (483 mm)
15" deep (381 mm)
10.5" (4 U) high (267mm)

Weight: 40 lbs (18 Kg) max
AC Power : 150 watts max. 110/220 selectable



ALL CHASSIS

Material: Gray Anodized extruded or sheet aluminum with a polycarbonate front panel overlay.
Mounting Hardware: Rack Mount handles are standard. Flush mount flanges available at no added cost.
Protection: Selectable AC input fused at: 2 amps 110 VAC, 1 amp 220 VAC.

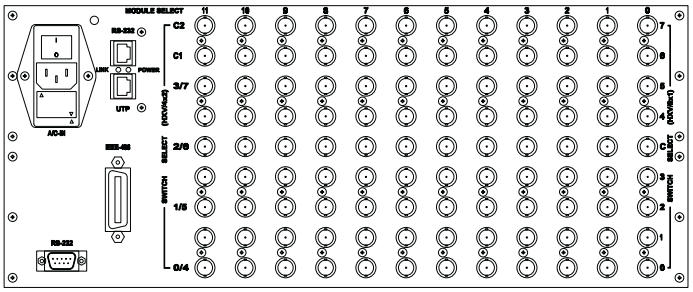
FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

HXV/96 MAINFRAME

This chassis controls up to 96 switch points. A typical application would be 12 HXV/8x1 Switch Modules, but many configurations are possible using different switch modules. One CL8 Display/Driver Modules is needed to drive each switch modules. The CL8s also have built-in LEDs that show switch status. Add switch modules, the required CL8s, a control module and the optional keypad manual control to complete the system. Standard chassis measure 15.6" deep and 7" high. Purchasing a HXV/96 chassis only partially filled with switch modules allows cost-effective future expansion.

Dimensions: 19" rack mount (483 mm)
15" deep (381 mm)
7" (4U) high (178 mm)

Weight: 30 lbs (14 Kg) max
AC Power : 150 watts max. 110/220 selectable



HXV/96 Mainframe with with IEEE488/RS232, Ethernet and manual MC-2 Keypad Controls

HXV EXPANSION CHASSIS

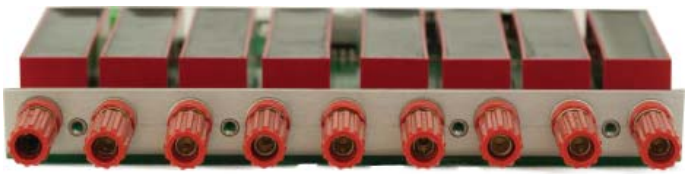
HXV/32, /96 and /128 are also built as expansion chassis that are used with a MESA Control Chassis as shown in the **MESA Bulletin**. Multiple expansion chassis allow large or complex systems having one point of control to be configured, resulting in cost savings. Expansion chassis do not have control modules installed. Add switch modules and CL8 Display/Driver Modules for the HXV/128 and HXV/96 as needed to complete the system.

CONNECTORS

Two standard connectors are offered: 1) coaxial SHVs are used for applications requiring shielded external wiring. SHVs are similar to BNCs but can NOT be plugged into BNCs. 2) Binding Post (also know as Banana Plugs) are used when external wiring is simply unshielded point to point hookup wires.

SHV Coaxial Connector

Binding Post (Banana Jack)



HXV/8x1-BP Switch Module

LED INDICATORS / STATUS FEEDBACK

All HXV Mainframe and Expansion Chassis have LED displays that show the on/off state of every relay. The LED indicators are visible on the front panel and are labeled to match the programmatic address of the relays.

The LEDs provide an invaluable aid for program debugging and troubleshooting. They allow the user to easily verify switch point status by simply looking at the system's front panel.

HXV/32 chassis have 32 switch status LEDs built into the front panel. The LEDs are included in the chassis price.

HXV/ 96 and /128 Mainframes chassis require one CL8 Display Module to drive each switch module. CL8 LEDs are visible thru cutouts in the front panel. These display modules must be purchased separately, in addition to the switch modules.

HXV CUSTOM SYSTEMS

CYTEC Corp. takes pride in building custom systems that meet non-standard or special customer specifications. Please call 1-800-346-3117 or email sales@cytec-ate.com to contact an Application Engineer and discuss details.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

HXV SERIES SWITCH MODULES

The HXV Series switch modules are built with special high voltage reed relays that hot switch up to 3500 volts and cold switch carry 5000 volts. Applications include HiPot testing, insulation breakdown testing and other extreme voltage requirements. Standard I/O signal connectors are either -SHV coaxial or -BP banana plugs. The modules can be wired together internally to furnish larger configurations while eliminating external connections. For example, chassis can be supplied pre-wired as 32x1 to 128x1 multiplexers, or as 16x2 to 64x2 matrices.

HXV/8x1

This switch module has eight Form A (Normally Open) relays arranged in an 8x1 configuration as shown in **Fig. 1**. A screw terminal connector is built into the module so that the COM connections of several modules may be wired together inside the chassis to form larger multiplexers.

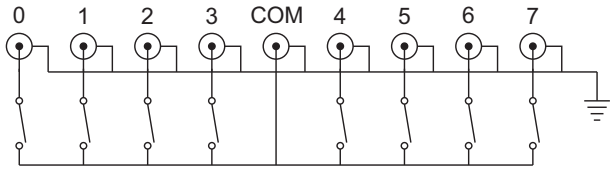


Fig. 1 HXV/8x1 Switch Module

HXV/4x2

This switch module is built with eight Form A (SPST) relays arranged in a 4x2 matrix configuration as shown in **Fig. 2**. Built-in screw terminal connectors allow the two COM connections to be wired together with other switch modules inside the chassis to form larger matrices such as 8x2, 16x2, etc.

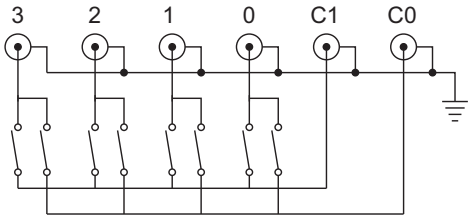


Fig. 2 HXV/4x2 Switch Module

HXV/8-K

This module is built with eight individual Form A Normally Open-relays. Each relay is wired out to one input and one output connector. See **Fig. 3**. The module takes up a double slot in the chassis.

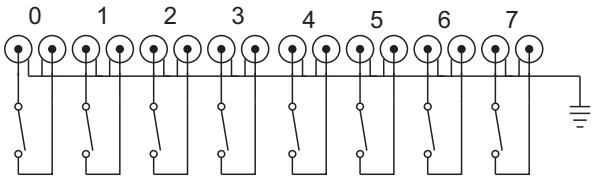


Fig. 3 HXV/8K Switch Module

RELAY SPECIFICATIONS

Contact Rating	200 Watts
Switch Voltage	3500 Volts
Switch Current	3.0 Amps
Carry Current	5.0 Amps
Breakdown Voltage	5000 Volts RMS
Operating Time	3.0 msec
Life Expectancy	100 million operations mechanical
Power consumption	70 ma @ 12 VDC = .84 Watts
RF Specs:	
Bandpass	DC to 50 MHz (individual modules)
Isolation	

SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

CUSTOM SYSTEMS ARE AVAILABLE.

DON'T SEE WHAT YOU NEED? PLEASE CALL FOR MORE OPTIONS.

CONTROL MODULES

IF-5C IEEE488/RS232 16 and 32 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all 16 or 32 channel chassis.

IF-5 IEEE488/RS232 64 and 128 Channel Control
This Module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5. This combination module is used on all 64 or 128 channel chassis.

IF-6 LAN INTERFACE
This Module uses TCP/IP to allow control from a local area network as described in AP-5. It is available as an option on any mainframe or MESA chassis also using RS232 control.

MANUAL CONTROL OPTION

Manual Controls are available for all mainframe chassis.

HXV/32 Mainframes chassis can be purchased with an optional 32 channel pushbutton manual control PB/32.

HXV/96 and **HXV/128** mainframes can be built with optional keypad manual controls MC-2.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

YTEC CORP.

BULLETIN
LX-6

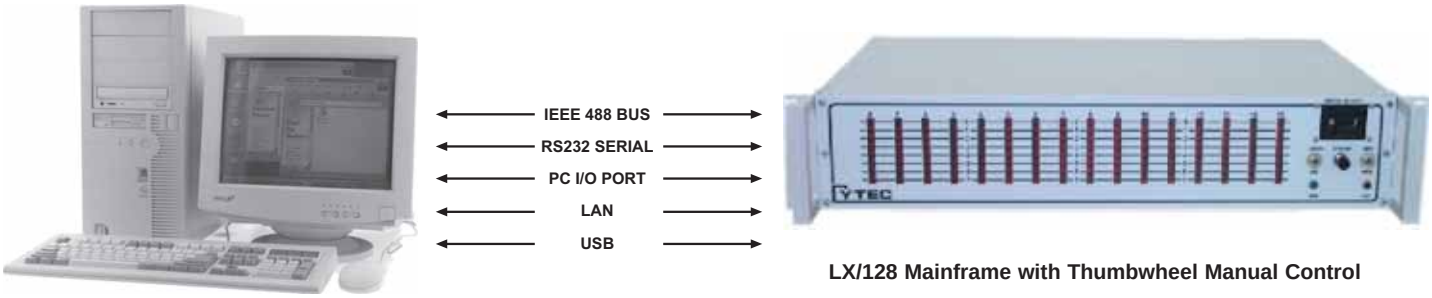
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 Fax (585) 381-0475

LX SERIES

GENERAL PURPOSE SWITCHING MATRICES

FOR AUTOMATIC TEST, INSTRUMENTATION AND CONTROL

The LX Series are high reliability, low cost, versatile Switching Systems. A modular design concept is used. Interchangeable Control Modules, Switch Modules and Display Modules can be assembled into Matrices, Multiplexers or Individual Switch Point configurations. All chassis have full front panel LED displays. Status Feedback from all switches is provided. A variety of switch modules are offered, including those designed to handle the following signals: Coaxial RF, Low Level with a DC offset less than 1 microvolt, High Voltages up to 1500 volts, and High Current up to 8 amps.
The Control Modules available are IEEE488 Bus, RS232 Serial, TTL Parallel Port, 10Base-T Ethernet LAN, and Universal Serial Bus. Manual Controls are optionally available.



LX/128 Mainframe with Thumbwheel Manual Control

LX MAINFRAMES

The LX Series Mainframes are 19" rack mounting chassis, 3.5" high and 15.6" deep, with power supplies and motherboards that hold up to 16 Switch and Display Modules and one Control Module. Signal connectors are located at the unit's rear panel and LED display is visible through the front panel.
The following Mainframes are standard:

LXA GENERAL PURPOSE

These are the most versatile units, accepting any of the LX Series Switch Modules and capable of furnishing Multiplexers, Matrices or Individual Switches as needed.

LXB MATRICES

These mainframes hold the LXB Series Switch Modules and furnish several prewired Matrix configurations.

LX EXPANSION CHASSIS

These units have the same motherboards as the mainframes but do not have built-in power supplies or control modules. They are powered and controlled from a single MESA Control Mainframe as described in the **MESA Bulletin.** Larger configurations can be created from up to 16 Expansion Chassis, and different product series can be combined to supply a complete system for switching a variety of signals.

LX-W WIRED UNITS

All Mainframes and Expansion Chassis can be supplied in 15.6" deep chassis with modules wired out to user specified connectors. Please contact our Applications Engineers for more information.

SWITCH MODULES

There are two basic switch module series: The **LX8 Series** and **LXB Series**. All modules have signal connectors accessed at the chassis rear panel.

LX8 SERIES

These modules are used in the LXA Mainframes and include the following:
LX8/G2 Switch Modules are built with 8, two pole relays and have signal inputs and outputs arranged so that they can be wired to supply several matrix configurations.
LX8/G1P Switch Modules are built with 8, single pole Type P Power Relays. These are designed for high power and current applications and have signal connectors that can be wired to provide several matrix configurations.
LX8/K Switch Modules have 8, Normally Open single pole relays with inputs and outputs wired to a signal connector.
LX8/OD Driver Modules have 8, optoisolated Output Drivers and are used to drive external logic or electrical loads.
LX8/ID Input Detection Modules have 8, optoisolated Input Detectors that are capable of sensing DC or AC voltage levels.

LXB SERIES

These Switch Modules are used in the LXB Matrices and include the following:
LXB/2(1x4) Switch Modules have 8, single or double pole relays arranged as two 1x4 matrices.
LXB/4(1x2) Switch Modules have 8, single or double pole relays arranged as four 1x2 matrices.
LXB/(1x8) Switch Modules have 8, single or double pole relays arranged as one 1x8 matrix.

LXA GENERAL PURPOSE SERIES

The LXA Series are 19" rack mounting Mainframes or Expansion Chassis, 3.5" high, with motherboards that hold any of the LX Series of Switch Modules, Latching/Display Modules and a Control Module.

LXA/128 MAINFRAME

This chassis is 15.6" deep. It is built with power supplies and motherboards that hold a Control Module, up to 16 LX8 Switch Modules and 16 CL8 Latching/Display Modules. The Signal Motherboard busses the switch modules together (shown in **Fig. 1)** to furnish a number of different Matrix configurations.

LXA/128-E EXPANSION CHASSIS

These chassis are 15.6" deep and hold the same motherboards as the Mainframe but without power supplies or a Control Module. Each Expansion Chassis is powered and controlled via a MESA Control Mainframe as shown in the **MESA Bulletin.**

LXA/128-W WIRED CHASSIS

Mainframes and Expansion Units can be supplied in 15.6" deep chassis with signal inputs and outputs wired to user specified connectors on the rear panel.

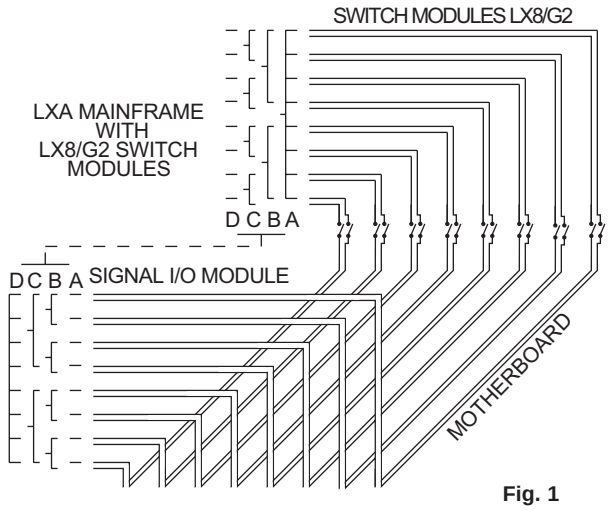


Fig. 1

LXA SWITCH MODULES

These Switch Modules plug into the LXA Motherboard and have signal connectors that are accessed from the chassis rear. The CL8 Latching/Display Modules mate with and drive the relays on the Switch Modules and have LEDs that are visible through the chassis front panel. The following modules can be assembled in any LXA chassis.

LX8/G2 SWITCH MODULES

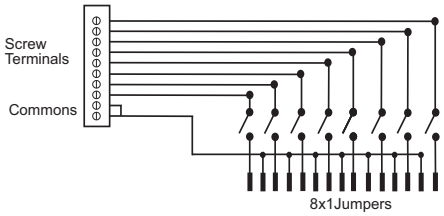
Each module has 8, two pole relays. One side of each relay wires to the module's rear panel connector, and the other side wires to a card edge connector which plugs into the Signal Motherboard. The motherboard busses together the Switch Modules and a Signal I/O Module as shown in Fig. 1. Energizing a relay connects the path between the Switch Module and the Signal I/O. Switch Module and Signal I/O Module connectors can be wired to furnish the following different configurations:

A - Each module is a 1x8 and 16 modules create a 16x8 matrix.
B - Each module is a 2x4 and 16 modules create a 32x4 matrix.
C - Each module is a 4x2 and 16 modules create a 64x2 matrix.
D - Each module is an 8x1 and 16 modules create a 128x1 mux.

LX8/G2-R is built with a 20 pin IDC header signal connector with J20R or J20C mates. The switch module is available with Type S Standard, M Mercury or LT Low Thermal reed relays**.**
LX8/G2-E has a card edge connector with J20 mates and is recommended for higher voltages when using Type M Mercury or Type HV High Voltage reed relays.

LX8/G1P-ST POWER SWITCH MODULE

This module is built with 8, Type P Power relays and Screw Terminal signal connectors. It differs from the other LX8/G Switch Modules in that single pole, high power switching is provided. This module can also be used as an individual 8x1 multiplexer. Two pole relay versions of this module are available.



LX8/K SWITCH MODULES

These modules have 8 individual Form A (SPST) single pole relays. The two sides of the relays wire out to the signal connector located at the chassis rear as shown in Fig. 2.

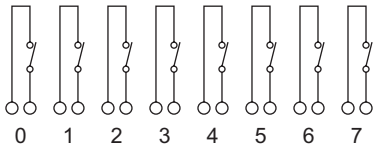


Fig. 2

Three LX8/K Modules are offered:
The **LX8/K-E** is built with a 20 pin card edge connector with J20 mates. It is available with Type S, HV or M reed relays.
The **LX8/K-R** has an IDC header connector and is available with Type S, M or A relays.
The **LX8/KP** is built with screw terminal connectors and Type P relays that are capable of switching high power and current. Mating connectors are included in the price of this module.

LX8/OD OUTPUT DRIVER MODULE

These modules have 8 individual optoisolated Solid State Output Drivers with 16 Pin Screw Terminal connectors. Mating connectors are included in the price of these modules.
LX8/OD-TTL Outputs TTL level signals of 100 mA at 5 VDC.
LX8/OD-MP is a medium power driver with up to 1 amp drive at 24 VDC.
LX8/OD-HP is a high power driver outputting 1 amp at 48 VDC.

LX8/ID INPUT DETECTION MODULE

This module is used to detect voltage levels in either DC or AC circuits. The module supplies eight separate, optoisolated two wire inputs and has 20 pin header connectors with J20R or J20C mates. This module does not require a CL8 Display Module as it has its own LEDs that show Input States (e.g. detected signals above threshold level).

LXB MATRIX SERIES

The LXB Series units are two pole switch matrices and are available as either Mainframes or Expansion Chassis. They are well suited for use in two wire data communications applications, including T1 and ISDN, where wiring is minimized and performance is optimized. The following matrix configurations are available: Two separate 16x4's in one chassis, one 16x8, one 32x4 or one 64x2. Signals connectors include BNCs, Screw Terminals or Three Pin Headers. Twin BNCs are available at extra cost.

MAINFRAMES

There are two basic Mainframes: The LXB/2(16x4) and the LXB/64x2. Both are 19" rack mounting chassis, 3.5" high and 15.6" deep. Each mainframe is built with power supplies and motherboards that hold up to 16 Switch Modules, 16 Latching/Display Modules and a Control Module. Manual Controls are optional.

LXB/2(16x4) MAINFRAME

This mainframe accepts up to16 LXB/2(1x4) Switch Modules to form two separate 16x4 Matrices as shown in **Fig. 3.** Jumpering Inputs A & B on the Switch Modules forms a 16x8 Matrix. Motherboard jumpers can also be added to bus Outputs 1 & 5, 2 & 6, 3 & 7 and 4 & 8 to connect the two 16x4 Matrices to create a single 32x4 Matrix.
Bandpass is 40 MHz at -3dB and **Crosstalk** is less than -60dB at 10 MHz.

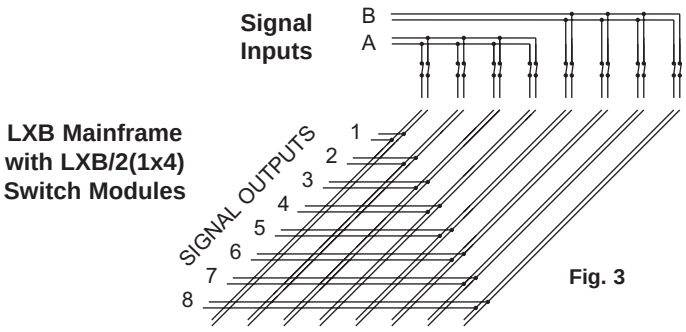


Fig. 3

LXB/64x2 MAINFRAME

This mainframe accepts up to 16 LXB/4(1x2) Switch Modules and one Signal I/O Module. The Signal I/O Module interconnects the Signal Motherboard bus traces to form a 64x2 Matrix as shown in **Fig. 4**.
Bandpass is 15 MHz and **Crosstalk** is less than -60dB at 10 MHz.

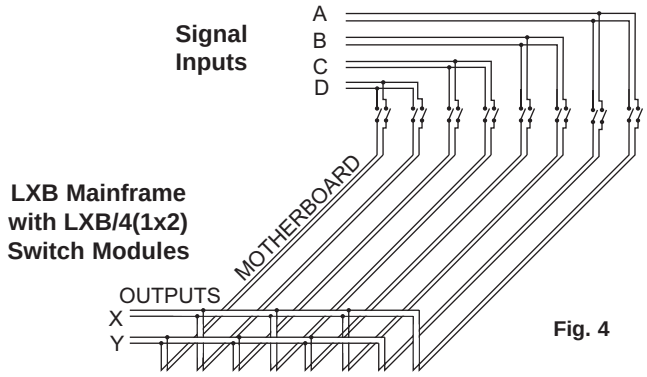


Fig. 4

LXB/2(16x4)-E EXPANSION CHASSIS

This unit has the same motherboards as the Mainframe without power supplies, and is controlled from a MESA Unit as described in the **MESA Bulletin**.

LXB/64x2-E EXPANSION CHASSIS

This unit has the same motherboards as the Mainframe without power supplies, and is controlled from a MESA Unit as described in the **MESA Bulletin**.

LXB SWITCH MODULES

LXB/2(1x4) SWITCH MODULE

This module has 8, single or double pole relays arranged as two separate 1x4 matrices as shown on **Fig. 3.** It plugs into the LXB Signal Motherboard. The two matrices, A & B, can be jumpered on the module to create one 1x8 matrix.
This module is available with Type S Standard, Type M Mercury, Type LT Low Thermal and Type HV High Voltage relays. The following connectors are available: Type E- 20 pin card edge, Type N - BNC receptacles, Type H - Three Pin Headers or Type ST - Screw Terminals. Twin BNCs are available at extra cost.

LXB/2(1x4)-2P-ST SWITCH MODULE

This module is similar to the above, except it is built with 8, two pole Type P Power Relays and Screw Terminal connectors. It is used for higher power or current applications where a matrix configuration is required. Mating connectors are included in the price of the module.

LXB/4(1x2) SWITCH MODULE

This module has 8, single or double pole relays arranged as four 1x2 matrices as shown in **Fig. 4**.
The module is available with Type S, Type M or Type LT relays.
The following connectors are available: Type N - BNCs, Type H - Three Pin Headers or Type ST - Screw Terminals. Twin BNCs are available at extra cost.

LXB/(1x8) SWITCH MODULE

This module has 8, single or double pole relays arranged as one 1x8 matrix.
The module is available with Type S, Type M or Type HV relays and Type E - 20 pin card edge connectors.

CL8 LATCHING/DISPLAY MODULE

The CL8 Latching/Display Modules drive the selected relay and have individual LEDS that show every switchpoint state (open or closed).

GX GROUP SWITCH

LX8/G2 Switch Modules can be used in either the GX/8 or GX/16 Group Switch Chassis to switch signals in groups of 16 wires in up to a 16x1 Multiplexer configuration. For more information see the GX Bulletin.

LX SERIES SWITCH SPECIFICATIONS

These Switch Modules are built with several different relay types, as determined by the switched signals.

Type S Standard reed relay is used for general purpose instrumentation level signals.

Type M Mercury reed relay switches higher power signals.

Type LT Low Thermal reed relay has a thermal offset of less than 1 microvolt and is used for for very low level signal applications.

Type HV High Voltage reed relay is rated at 1500 volts breakdown voltage.

Type P High Power armature relay has an AC rating of 2000 VA and can switch up to 8 amps.

Type S, **Type M**, **Type LT**, and **Type HV** are all high reliability reed relays with a guaranteed life of 100 million operations when used within the following specifications. **Type P** relays are armature type and have a mechanical life of 10 million cycles.

SPECIFICATIONS	S	M	LT	HV	P
Contact Rating VA	10	50	10	10	150
Switching Voltage	200	500	200	1000	500
Switching Current	.05VA	1.0A	.05A	0.1A	8A
Carrying Current	1.0A	2.0A	1.5A	1.0A	10A
Breakdown Voltage	400	1000	400	1500	1400
Operate Time msec	1	2	1	1	10
Rated Operations	10^8	10^8	10^8	10^8	10^7

OVERALL SPECIFICATIONS

DIMENSIONS - Standard Mainframes are 19 inch Rack Mounting, 3.5 inches high and 15.6 inches deep. Wired Mainframes are 15.6 inches deep.

WEIGHT - Maximum weight,with a full complement of Modules, is less than 25 lbs.

POWER - 100 watts at 100-130 Volts AC or 200-260 Volts AC.

ENVIRONMENT - Operating 0^0 C to 50^0 C @95% Relative Humidity
Storage -25^0 C to 65^0 C @95% Relative Humidity

SOFTWARE

Drivers and Sample Programs are available for the most common programming languages. These check the entire system by cycling through all switches, sequentially latching and unlatching each switch while checking Status.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Material or Workmanship for a period of 5 years, and that all switches are guaranteed for their Rated Operations.

LX CONTROL MODULES

The LX Mainframes can be computer controlled via the modules listed below. Each Control Module selects any Switchpoint and Latches, Unlatches and returns Status of that point.

IF-1 PARALLEL PORT

This module requires 14 individual TTL level binary lines from the controlling computer. These select Switch and Mode, Strobe the selected command and return SwitchPoint Status.

IF-5 IEEE488/RS232

This module combines both the IEEE488 Talk/Listen and the RS232 features detailed in the **AP-5 Bulletin**.

IF-6 LAN INTERFACE

This module allows control via a 10Base-T Ethernet LAN using TCP/IP protocol detailed in the **AP-5 Bulletin**.

IF-7 COMBINED USB/RS232

This module furnishes computer control via either RS232 or Universal Serial Bus. It allows users to switch to USB control as COM ports are obsoleted on new computers.

MANUAL CONTROLS

MC/128-TW MANUAL CONTROLS

Front panel thumbwheels and push button Manual Controls select and control all Mainframe Switchpoints. This manual control can be "locked out" by the computer.

VMCS VIRTUAL MANUAL CONTROL SOFTWARE

This Software displays a full Graphical User Interface (GUI) on the controlling computer. The operator controls the Mainframe with simple mouse point-and-click operations. The software can also be used to control the unit over a LAN.
A demo version is available on our web site at:
http://www.cytec-ate.com/soft.htm

PALM PC MANUAL CONTROL

This is currently available for use with the IF-5 IEEE488/RS232 Control Module. Application Programs running on the Palm PC display a virtual keypad manual control.

ACCESSORIES

MATING CONNECTORS

J3	Three Pin Header Connector
J10	Ten Pin Card Edge Connector
J20	Twenty Pin Card Edge Connector
J20R	Twenty Pin Ribbon Connector
J20C	Twenty Crimp Pin Connector

CABLES

CBL-0.5	IEEE488 Cable .5 Meters long
CBL-1	IEEE488 Cable 1 Meter long
CBL-2	IEEE488 Cable 2 Meters long
RS-1	RS232 Cable 1 Meter long
PC-2	PC Interface Cable 2 Meters long

CHASSIS SLIDES

CHS-1	Chassis Slides with 15 inches travel

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

YTEC CORP.

BULLETIN
VX-5

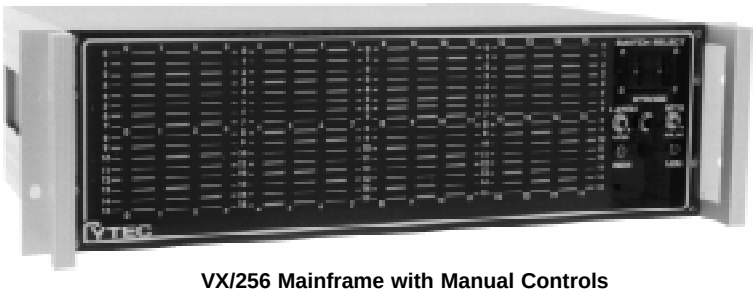
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 Fax (585) 381-0475

VX SERIES

SWITCHING SYSTEMS

FOR AUTOMATIC TEST, INSTRUMENTATION AND COMMUNICATIONS

The VX Series of low-cost, versatile Switching Systems use a modular concept of Switch Modules, Display Modules and Control Modules which can be assembled into VX/256 Mainframes as Matrices, Multiplexers or Individual Relays.
All units have front panel LED displays and Status feedback of selected relays.
Control Modules are available for IEEE488 Bus, RS232 Serial, 10Base-T Ethernet LAN, and optional Front Panel Manual Controls.



VX/256 Mainframe with Manual Controls

VX/256 MAINFRAMES

The Mainframes are 19" rack mounting units 5.25" high and 12" deep with power supplies and motherboards to accept up to 16 VX Switch Modules, Display Modules and a Control Module. These modules plug into the mainframes so that signal inputs are accessible on the back panel and the LED displays are visible through the translucent front panel.
The Mainframes accept any of the VX Switch Modules.

VX/256-E EXPANSION CHASSIS

These units have the same prewired motherboards as the mainframes but do not have power supplies or control modules. They are powered and controlled from the MESA Control Unit as detailed in the **MESA Bulletin.**

VX/256-W WIRED UNITS

All mainframes and expansion chassis can be supplied in 16" deep chassis with modules wired out to user specified connectors in any required configuration.

CL16 DISPLAY MODULES

One Display Module is required for each Switch Module. It has the controls for selecting and Latching or Unlatching the 16 relays in the Switch Module. Sixteen LEDs in series with the relays give an absolute indication that the relays are energized. The LEDs are visible through the front panel and are a valuable aid in checking the matrix status.
The CL16 also includes Status Feedback to the computer to verify that selected relays are energized by checking the relay drive output.

SWITCH MODULES

Each Switch Module has sixteen relays and each relay can be individually latched or unlatched and the Status displayed by the CL16 Display Module.
The following Switch Modules are available:

VX/4(1X4) MODULE

This versatile module has four 1x4 two pole matrices which can be configured as two 1x8 Matrices or one 1x16 module.

VX/G MODULES

These modules have 16 relays with inputs on header connectors and outputs bussed on the motherboard.
VX16/G2 has 16 two pole relays.
VX16/G3 has 16 three pole relays.
VX16/GC has 16 single pole **Form C** relays.

VX/K MODULES

These modules have 16 individual relays and are not bussed to the motherboard.
VX/KA has 16 single pole **Form A** relays.
VX/KC has 16 single pole **Form C** relays.

VXC MODULES

These modules are high frequency coaxial matrices with **SMA** connectors.
VXC/4x4 has 16 single pole coaxial relays arranged in a 4x4 configuration.
VXC/8x2 has 16 single pole coaxial relays arranged in an 8x2 configuration.

VX/256 CHASSIS

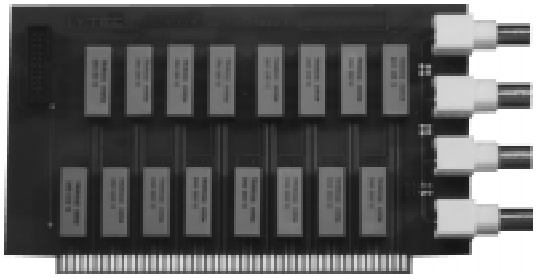
The VX/256 Chassis consist of Mainframes and Expansion Chassis with pre-wired motherboards which accept 16 of the VX Switch Modules and Display Modules.
The motherboards are assembled so that the Switch Module signal connectors are accessible from the chassis back panel and the LEDs are visible through the front panel.
The VX/256 Mainframes have power supplies and are pre-wired for a Control Module.
The VX/256-E Expansion Chassis are powered and controlled from the MESA Control Unit detailed in MESA Bulletin.

VX MATRIX SWITCH MODULE

These modules have 16 two pole relays arranged as four 1x4 matrices as shown in Fig. 1. One side of each matrix is wired to signal connectors and the other side is wired to card edge connectors which plug into the VX/256 Signal Motherboard. The signal connectors available include BNC, 3 pin Header or Screw Terminals.
The modules are available with Type S, M or LT reed relays.

SWITCH MODULE CONFIGURATIONS

The basic Switch Module shown in Fig. 1 includes bus points A, B and C which allows the module to be configured as either a VX/4(1x4), VX/2(1x8) or VX/1x16 Module.
VX/4(1x4) Module has no bussing and configures as **four 1x4** matrices. Allows formation of 4x4 through 64x4 Matrices.
VX/2(1x8) Module is bussed at points A & C to form **two 1x8** matrices**.** Allows formation of 2x8 through 32x8 Matrices.
VX/1x16 Module is bussed at bus points A, B & C to form **one 1x16** matrix. Allows formation of 1x16 through 16x16 Matrices.



MATRIX CONFIGURATIONS

Several different Matrix configurations can be assembled in the VX/256 Chassis using the three different VX Matrix Switch Modules and by bussing on the Signal Motherboard.
Bandpass is DC to 10 MHz and Isolation is better than -60dB at 1 MHz.

VX/4(1x4) CONFIGURATIONS

Four 16x4 Matrices can be configured without any bussing as shown in **Fig. 2**.
Two 32x4 Matrices can be configured by bussing between Matrices 1 & 2 and between Matrices 3 & 4 in **Fig. 2**.
One 64x4 Matrix can be configured by bussing between Matrices 1, 2, 3 & 4 in **Fig.2**.

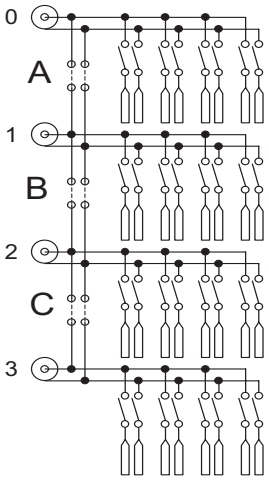


Fig. 1

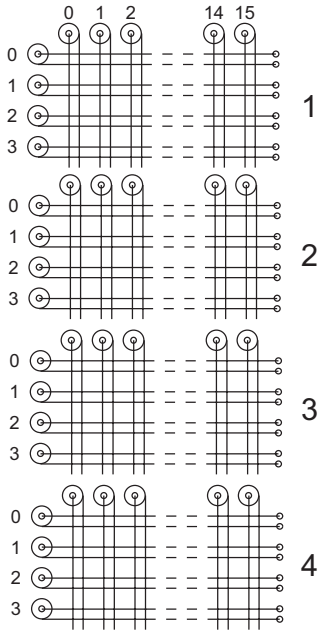


Fig. 2

VX/2(1x8) CONFIGURATIONS

Two 16x8 Matricess can be configured as shown in **Fig. 3** without bussing the Motherboard.
One 32x8 Matrix can be configured by bussing between Matrices 1 & 2 in **Fig. 3**.

VX/1x16 CONFIGURATIONS

One 16x16 Matrix can be configured as shown in **Fig. 4** without bussing the motherboard.

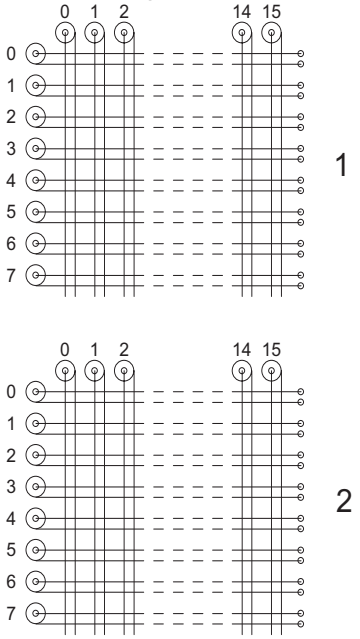


Fig. 3

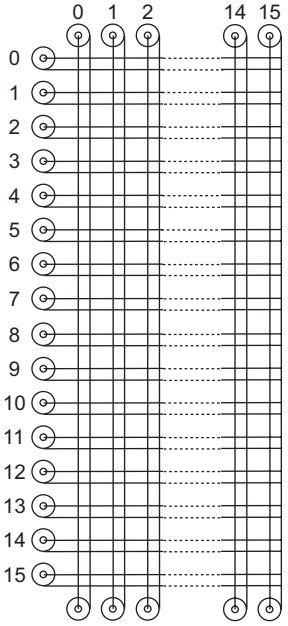


Fig. 4

VX GENERAL PURPOSE MODULES

VX/G SWITCH MODULES

These modules have the inputs of 16 relays wired to header connectors on the rear edge of the module and the outputs wired to the motherboard as shown in **Figs. 5 & 6**.
Plugged into the bussed motherboard, the modules can be wired in configurations of **16x16, 32x8, 64x4, 128x2 or 256x1**.
The following types of modules are available:
VX16/G1 has 16 single pole relays wired to two 20 pin headers as shown in **Fig. 5** and is available with **Type S** or **M** reed relays.
VX16/G2 has 16 two pole relays wired to two 20 pin headers as shown in **Fig. 5** and is available with **Type S, M** or **LT** reed relays.

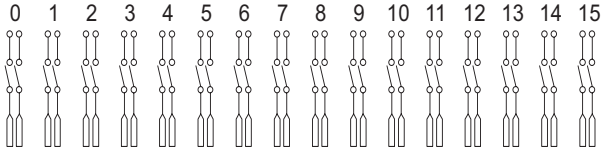


Fig. 5

VX16/G3 has 16 three pole relays wired out to a 50 pin header and is available with **Type S, M**, or **LT** reed switches.

VX16/GC has 16 single pole, **Form C** relays wired out to two 20 pin header connectors as shown in **Fig. 6**.
These modules are available with **Type CS** relays.

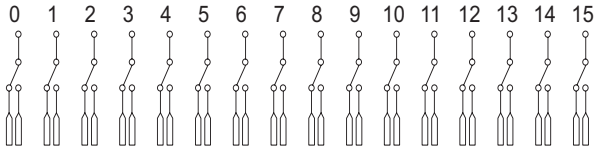


Fig. 6

VXC/4X4 COAXIAL SWITCH MODULE

This module has 16 single pole coaxial relays interconnected by 50 ohm characteristic impedance striplines in a 4x4 matrix configuration as shown in **Fig. 9**. The inputs and outputs are wired out to coaxial connectors on the rear of the module which can be **SMA, SMB** or **Coaxicon**. There are no connections to the motherboard.
Bandpass is DC to 400 MHz (-3dB).
Crosstalk and Isolation are better than 60 dB at 10 MHz.

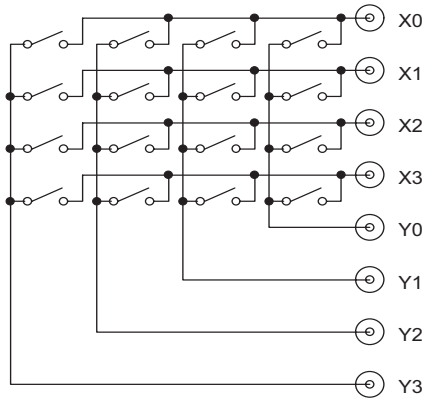


Fig.9

VX/K SWITCH MODULES

These modules have 16 individual relays with both inputs and outputs brought out to header connectors on the rear of the module. There are no connections to the motherboard, and these modules can be used in any combination with other VX modules.
There are two types of modules:
VX/KA has 16 **Form A** relays wired out to two 20 pin header connectors as shown in **Fig. 7**. It is available with both **Type S** or **M** reed switches.
VX/KC has 16 **Form C** relays wired out to a 50 pin header connector as shown in **Fig. 8**. It is available with both T**ype CS** or **CM** reed switches.

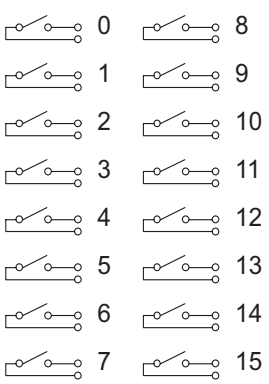


Fig. 7

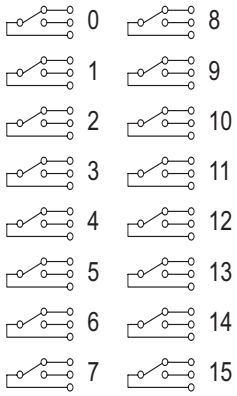


Fig. 8

VXC/8X2 COAXIAL SWITCH MODULE

This module has 16 single pole coaxial relays interconnected by 50 ohm characteristic impedance striplines in an 8x2 matrix configuration as shown in **Fig. 10**.
The inputs are wired out to **SMA** connectors on the rear of the module.
The outputs are switched through isolation relays to two **SMA** connectors on the back panel and to the card edge connector which plugs into a coaxial motherboard.
Bandpass is DC to 200 MHz (-3dB).
Crosstalk and Isolation are better than 60 dB at 10 MHz.
When plugged into the coaxial motherboard, the bandpass is dependent on matrix size due to the stub length, and in a 128x2 matrix, the bandpass is 50 MHz.

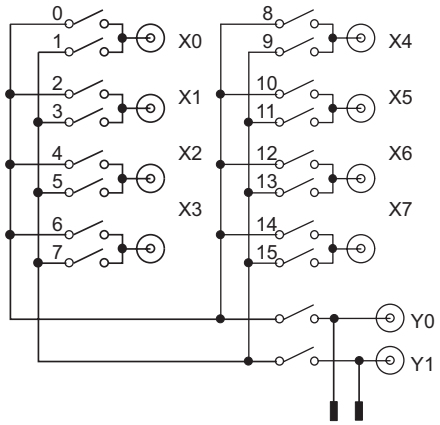


Fig. 10

GX GROUP SWITCH

VX16/G2 & VX16/G3 Switch Modules can be used in the GX/16 Group Switch Chassis to switch signals in groups of up to 48 wires in up to a 16x1 Multiplexer configuration. For more information see GX Bulletin.

VX SERIES RELAY SPECIFICATIONS

The relays use high reliability reed switches with a guaranteed life of 100 million operations when used within the following specifications:

Type S and CS Standard switches are for general purpose instrumentation level signals.

Type M and CM Mercury switches are for higher power switching.

Type LT Low Thermal switches have offset of less than one microvolt for very low signal level measurements.

SPECIFICATIONS	S	M	LT	CS	CM
Contact Rating VA	10	50	10	3	30
Switching Voltage DC	200	500	100	200	350
Switching Current DC	.5A	1.0A	.25A	.25A	1.0A
Carrying Current DC	1.0A	2.0A	1.0A	1.0A	2.0A
Breakdown Voltage DC	400	1000	400	200	1000
Operate Time MSec	1	2	1	1.5	3

GENERAL SPECIFICATIONS

DIMENSIONS - 19" Rack Mounting, 5.25" high and 12" deep.
WEIGHT - With full complement of Modules - 25 lbs.
POWER - 100-130 Volts AC or 200-240 Volts AC 50-60 Hz, 100 VA.
ENVIRONMENT - Operating at 0^0 C to 50^0 C.
Storage at -25^0 C to 65^0 C.

ACCESSORIES

MATING CONNECTORS

J3 - Three pin crimp type header connector.
J3ST - Three screw terminal type header connector.
J20-R - Twenty pin ribbon type header connector.
J20-C - Twenty pin crimp header connector.
J50-R - Fifty pin ribbon cable type header connector.
J50-C - Fifty pin crimp type header connector.

CABLES

CBL-0.5 IEEE488 Cable .5 meters long.
CBL-1 IEEE488 Cable 1 meter long.
CBL-2 IEEE488 Cable 2 meters long.
RS-1 RS232 Cable 2 meters long.

Cables and wired chassis can be built to customers specific requirements. Please contact our Sales Staff for more information.

CHASSIS SLIDES

CHS-1 Pairs of 19" rack mounting chassis slides with 15" travel.

CABINETS

Portable cabinets with handles for 19" rack mounted units with 10.5" panel spaces and 21" depth.

CONTROL MODULES

The VX Mainframes can be computer controlled via the modules listed below. Each Control Module selects any switchpoint and Latches, Unlatches and returns Status of that point.

IF-1 PARALLEL PORT

This module requires 14 individual TTL level binary lines from the controlling computer. These select Switch and Mode, Strobe the selected command and return switch point Status.

IF-5 IEEE488/RS232

This module combines both the IEEE488 Talk/Listen and the RS232 features detailed in the AP-5 Bulletin.

IF-6 LAN INTERFACE

This module allows control via a 10Base-T Ethernet LAN using TCP/IP protocol detailed in the AP-5 Bulletin.

MANUAL CONTROLS

M/256 MANUAL CONTROL

This manual control consists of thumbwheels and toggle switches on the front panel for switchpoint and mode selection. A Strobe pushbutton enters the data.
These controls can be "locked out" by the computer.

VMCS VIRTUAL MANUAL CONTROL SOFTWARE

This Software displays a full Graphical User Interface (GUI) on the controlling computer. The operator controls the Mainframe with simple mouse point-and-click operations. The software can also be used to control the unit over a LAN.
Windows based software is free with any purchase.
A demo version is available on our web site at:
http://www.cytec-ate.com/soft.htm

SOFTWARE

Drivers and Sample Programs are available for the most common programming languages. These check the entire system by cycling through all switches, sequentially latching and unlatching each switch while checking Status.

CUSTOM SYSTEMS

CYTEC Corp. can build Group Switches using a variety of Switch Modules, Connectors or mixtures of signal types. If you do not see what you need for your application, please contact us and give us the opportunity to recommend a solution.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Material and Workmanship for a period of 5 years and that all switches are guaranteed for their Rated Operations.

YTEC CORP.
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 Fax (585) 381-0475

JX SERIES MATRIX/MULTIPLEXERS FOR DATA ACQUISITION AND AUTOMATIC TEST

This compact and economically priced Series can be used as either Multiplexers, Matrices or Individual Switches. As Multiplexers, they can be used as a single multiplexer to switch a large number of inputs or outputs to one commpon port , or as a dual multiplexer to switch between either of two common ports. As Matrices, any number of switches can be selected and wired out in the required configuration. Individual Relays are available as SPST or SPDT with standard, mercury wetted or power relays.

Typical applications include:

- **Data Acquisition**
- **Component Testing**
- **Bed of Nails Testers**
- **Cable Testers**

JX/256 Multiplexer with Keypad Manual Control and Display

MAINFRAMES AND EXPANSION CHASSIS

- **Size -** Standard 19" rack mounting chassis, 5.25" high and 16" deep.
- **Prewired Backplane** accepts 16 Switch Modules and one Control Module. The Backplane includes signal bussing so that the Switch Modules can be interconnected up to a 512x1 Multiplexer or 256x2 Matrix.
- **JX/256 Mainframe -** This is a stand alone unit with its own Power Supplies controlled from any one of the Control Modules. It can also be supplied with an optional Manual Control and Front Panel LCD Display.
- **Optional Dual Supplies** - Standard power supplies allow up to 150 relays to be closed simultaneously. Dual supplies can be provided for applications requiring over 150 relays being closed at one time.
- **JX/256-E Expansion Chassis -** These chassis obtain their power and control from the MESA Series Control Units as detailed in the **MESA Bulletin** and any number of Expansion Chassis can be interconnected to make up large multiplexers.
- **JX/256-E-PS Expansion Chassis w/Power Supply -** These Expansion Chassis can be provided with Power Supplies for applications which require closing over 150 relays within the same chassis simultaneously. Call and discuss your application to determine if you need this option.
- **-W Option -** The Mainframes or Expansion Chassis can be supplied with all signals wired out to special, user specified connectors on the rear panel. Consult Factory for pricing.

FEATURES

- **Five Year Warranty**
- **Modular Construction** with expandability by adding Expansion Chassis and Switch Modules.
- **Control Modules** are available for Control from Combined IEEE488 BUS/RS232 Serial Port, 10BaseT Ethernet LAN or 16 BIT TTL Port.
- **Switch Modules** with 1, 2, 3 or 4 pole relays.
  Low voltage switching to 1 microvolt.
  Low current switching to 1 picoamp.
  High current switching to 8 amp.
  Breakdown voltage to 1000 volt.
- **Digital I/O Modules** having 16 TTL or Power Drivers.
- **Multiplex Mode -** The Unit can be operated as a single or dual multiplexer.
- **Matrix Mode -** Any number of Switches can be selected at the same time.
- **Manual Controls -** Switches can be selected by optional front panel keypad with LCD display.
- **Status -** Status feedback to the controller verifies the position of the relays.

SERIES JX16 SWITCH MODULES

The JX16 Switch Modules plug into the JX/256 Mainframe and Expansion Chassis and typically are built with 16 relays and their associated solid state controls, including Status feedback.
The Modules are available with high reliability reed relays that have a guaranteed life of 100 million operations and with the option of either Type S - Standard Dry Reed, Type M - Mercury Wetted Reed or Type LT - Low Thermal Reed. They are also available with Armature type Power Relays for switching up to 2000 VA power or 8 amps current.
There are three basic types of Modules: JX16/L for Multiplexing configurations, JX16/K for discrete relays, and JX16/AB for x2 Matrix configurations.

JX16/L SWITCH MODULES

This Series of Switch Modules has 16 relays configured as Multiplexers as shown in Figs. 1 & 2. These modules can be used as separate muxes or bussed together on the back-plane to form one multiplexer as large as 256x1.
Bandpass is 20 MHz (-3dB) and Isolation is less than 60dB at 1 MHz when used in a 256x1 Mux.

JX16/L1 AND /L2 SWITCH MODULES

This module has 16 single or two pole relays as shown in **Fig. 1** with signal inputs wired to a 34 pin header connector. The two 8x1 muxes may be jumpered together to form a 16x1. The outputs are available on a 10 pin header connector or can be jumpered to the card edge connector which plugs into the backplane. It is available with **Type S, M** or **LT** relays.

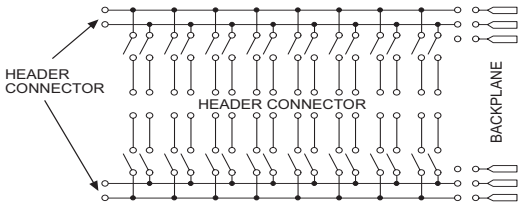


Fig. 1

JX 32/L2 SWITCH MODULE

This module has 32 two pole relays as shown in **Fig. 2** with signal inputs wired to two 34 pin header connectors. The two 16x1 muxes can be jumpered together to form one 32x1 mux. The outputs are available on a 10 pin header connector or can be jumpered to the card edge connector which plugs into the backplane. It is available with **Type A** relays only.

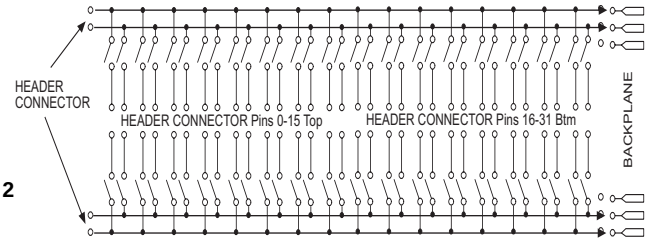


Fig. 2

JX16/4(4x1)-1 and -2 SWITCH MODULES

This module has 16 single or two pole relays arranged as four 4x1 multiplexers as shown in **Fig. 3**. The muxes may be jumpered to the backplane to form up to a 256x1 mux or two 128x1 muxes. It is available with **Type S, M** or **LT** relays.

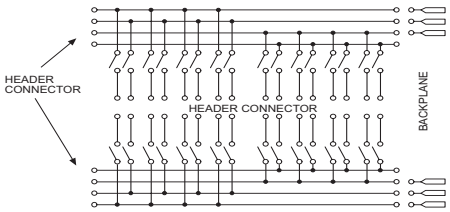


Fig. 3

JX16/K SWITCH MODULES

This Series of Switch Modules has 16 discrete relays with all contacts brought out to connectors accessible from the the chassis rear. Each relay has a Bandpass exceeding 20 MHz (-3dB) and Crosstalk less than 56dB at 1 MHz.

JX16/K1 SWITCH MODULE

This module has 16 single pole relays as shown in **Fig. 4** with both sides of all relays brought out to a 34 pin Header connector. The module is available with **Type S** or **Type M** relays.

JX16/KP SWITCH MODULE

This module has 16 single pole, **Type P** power relays as shown in **Fig. 4** with both sides brought out to a 37 pin D type connector.

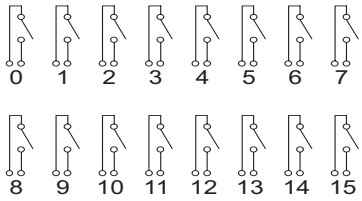


Fig. 4

JX16/KC SWITCH MODULE

This module has 16 single pole, double throw relays as shown in **Fig. 5** with all contacts brought out to a 50 pin Header connector. The module is available with either **Type CS** or T**ype CM** relays.

JX16/KCA SWITCH MODULE

This module has 16 single pole, double throw relays as shown in **Fig. 5** with all contacts brought out to a 50 pin Header connector. The module is available with **Type A** relays only.

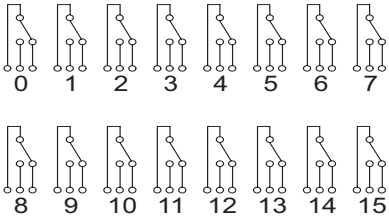


Fig. 5

JX16/KPC SWITCH MODULE

This module has 8 single pole, double throw discrete Form C **Type P** power relays shown in **Fig. 6** with all contacts brought out to screw terminal connectors.

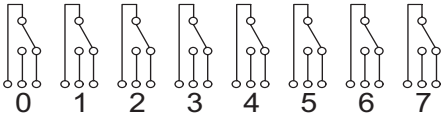


Fig. 6

JX16/AB SWITCH MODULES

These Modules typically have 16 relays configured as an 8x2 Matrix so that any of 8 inputs can be switched to either of 2 outputs. Bandpass is better than 20 MHz (-3dB) and Isolation is less than 40 dB at 100 kHz when used in a JX/256 chassis.

JX16/AB-1 SWITCH MODULE

This Module has sixteen single pole relays arranged in an 8x2 configuration so that any of the eight inputs can be switched to either output A or B as shown in **Fig. 7**. The eight inputs are wired to a 16 pin header connector with two pins wired to each input for convenience in daisy chaining modules. The A and B outputs are available on a 10 pin header connector, or they can be bussed to the backplane as shown in **Fig. 7**. The module is available with **Type S** or **Type M** reed relays.

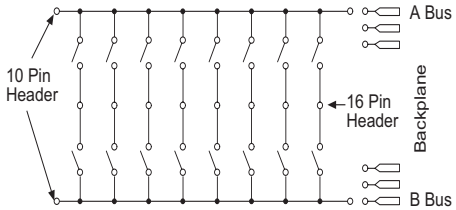


Fig. 7

JX32/AB-1 SWITCH MODULE

This Module has thirty-two single pole relays arranged in a 16x2 configuration so that any of the sixteen inputs can be switched to either output A or B as shown in **Fig. 8**. The sixteen inputs are wired to a 34 pin header connector with two pins assigned to each input for convenience in daisy chaining modules, and two pins are grounds. The A and B outputs are available on a 10 pin header connector, or they can be bussed to the backplane as shown in **Fig. 8**. The module is available with **Type S** or **Type M** reed relays.

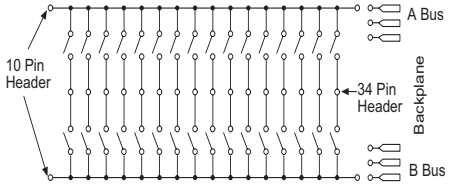


Fig. 8

JX16/AB-4 FOUR POLE MODULE

This Module has 16 four pole relays with signal inputs wired to a 37 pin D type connector as shown in **Fig. 9**. The outputs A and B are wired to the edge connector which plugs into the bussed motherboard. The module is available with **Type S** or **Type M** relays.

Note: This is the only module without Status Feedback.

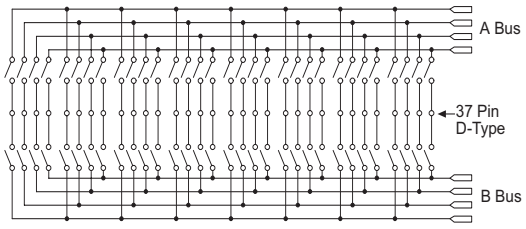


Fig. 9

A/B TYPE MODULE APPLICATIONS

For Cable, Backplane or Bareboard testing, the requirement is to select any two points and check for continuity. It is also necessary to check between one point and all others.

JX16/PROTO-I/O MODULE

This module, shown in **Fig. 10**, plugs into the JX Series backplane and has logic to control 16 TTL Outputs or Relay Driver Outputs and 16 TTL compatible inputs.

TTL Outputs are three state, Non Inverting Buffer/Line Drivers with output capability of 16 LSTTL loads.

Relay Driver Outputs are High Voltage, High Current, Open Collector Drives with diode suppression for energizing Inductive loads.

Data Inputs are Data Selector/Multiplexers with TTL compatible Inputs and three state output to the JX/256 Mainframe. This can be used to interrogate the status of the TTL or Relay Driver Outputs.

Connections may be wired to the 50 pin header supplied on the module or wired directly to the board.

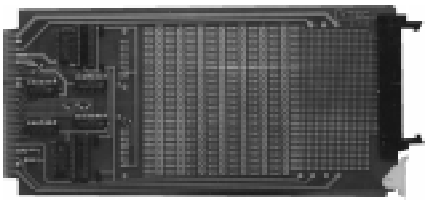


Fig. 10

SWITCH SPECIFICATIONS

The following types of relays are available:

Type S are dry reed switches for Instrumentation Level Signals.

Type LT has a thermal offset of less than 1 microvolt for very low voltage applications.

Type M has mercury wetted contacts with higher power capability.

Type CS and CM are form C versions of Type S & Type M.

Type A are two pole armature

All reed switches have a rated life greater than 100 million operations when used within the following specifications:

	RELAY TYPE				
	S&LT	M	CS	CM	A
Contact Rating	10VA	50VA	3VA	25VA	30VA
Switching Voltage	200V	500V	200V	200V	110V
Switching Current	0.5A	1.0A	0.25A	1.0A	1.0A
Carrying Current	1A	2A	1A	2A	1A
Breakdown Voltage	300V	1000V	200V	1000V	750V
Operate Time	1ms	2ms	1ms	2ms	3ms

Type P and PC Relays are armature relays for high power switching with the following specifications:

AC Rating	2000VA
DC Rating	150 W
Maximum Switch Voltage	380Volt RMS
Breakdown Voltage	1000Volt RMS
Maximum Switch Current	8Amp
Operate Time	10msec

CONTROL MODULES

Plug in modules can control the JX/256 Mainframe from either TTL Port, Combined IEEE488 BUS / RS232 Serial BUS or 10Base-T Ethernet LAN.
The Control Module selects any switch in the Mainframe and Latches or Unlatches the switch in either the Matrix or Multiplexer Mode and can also request the Status of selected switches.
In the Matrix Mode, any number of relays can be selected and Latched or Unlatched.
In the Multiplex Mode, only one relay is selected and Latched. All others are automatically Unlatched.

IF-J1 16 BIT TTL PORT

This Module has 16 TTL compatible lines for Relay Select, Mode Select, Status Switch and Strobe.

IF-J5 COMBINED IEEE488/RS232 MODULE

This Module has both IEEE488 BUS Control with Talk/Listen features and RS232 Serial Control. The Control Functions are detailed in Applications Bulletin AP-5.

IF-6 LAN/RS232 INTERFACE

This module interfaces between the Local Area Network and the RS232 Control Modules using TCP/IP commands as described in Applications Bulletin AP-5.

MANUAL CONTROLS

MC-2 MANUAL CONTROL WITH DISPLAY

This Manual Control Option has a Keypad and LCD Display on the front panel. The operator can select any switch and verify the switch Status via the display.

VMCS

This Virtual Manual Control Software enables a remote operator to view the Status of the Matrix and to Control Switch Selection using a full Graphical User Interface.

SOFTWARE

Visit our website for free software, drivers for common platforms and program expamples.

MATING CONNECTORS

J4C 4 pin connector using individual crimp pins
J8C 8 pin connector using individual crimp pins
J10R 10 pin IDC type ribbon cable connector
J10C 10 pin connector using individual crimp pins
J16R 16 pin IDC type ribbon cable connector
J16C 16 pin connector using individual crimp pins
J20R 20 pin IDC type ribbon cable connector
J20C 20 pin connector using individual crimp pins
J34R 34 pin IDC type ribbon cable connector
J34C 34 pin connector using individual crimp pins
J37R 37 pin D type ribbon cable connector
J37C 37 pin D type crimp pin connector
J50R 50 pin IDC type ribbon cable connector
J50C 50 pin connector using individual crimp pins

APPLICATIONS

SCANNER/MULTIPLEXERS

In this application, the Scanner is required to sequentially select any one of a number of inputs and switch it to a measuring instrument such as a DVM.
For low level signals, or in noisy environments requiring high common mode rejection, it is advisable to use two pole relays switching both the Hi and Lo input of the DVM as shown in **Fig. 11**.

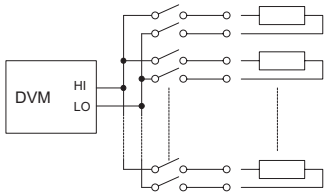


Fig. 11

For extremely low level signals such as thermocouples, the LT type relays with less than 1 microvolt of thermal offset should be used. For additional noise prevention, the shields from the pairs of wires can be switched to the Instrument Guard as shown in **Fig. 12**.

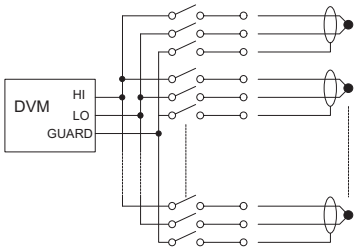


Fig. 12

KELVIN BRIDGE MEASUREMENTS

For very low impedance measurements using a four wire bridge, it is necessary to switch both Stimuli and Sense lines to each side of the device under test as shown in **Fig. 12**. This requires a total of 4 poles switching with two pole relays as shown in **Fig. 13**. Any two points can be selected, and the impedance between these points measured.

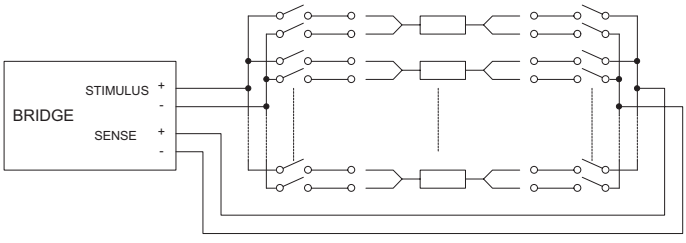


Fig. 13

WARRANTY

CYTEC Corp. warrants that all products are free from defects in workmanship and materials for a period of 5 years. Reed relays are guaranteed for 100 million operations when used within their published specifications.

CONTACT 1-800-346-3117 or WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

CYTEC CORP.

BULLETIN
4600-1

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

4600 SERIES

VERY HIGH DENSITY SWITCHING MATRICES

CYTEC's new 4600 Series are economical, high density, passive, bidirectional switch matrices. Each chassis holds up to 2048 two pole Type A relays, and a modular design allows great flexibility in creating different switching topologies. For example, the following single chassis configurations are all possible: 64x32 two pole matrix, 32x32 four pole matrix, 32x8 eight pole matrix or 32x8 sixteen pole matrix. Several independent matrices, such as a four separate 32x16 two pole matrices, can be provided in one chassis as well. Please contact CYTEC directly to discuss configuration options. Computerized control is via combined RS232/IEEE488, with 10BaseT Ethernet and Manual Controls optionally available.

4600 CHASSIS

The 4600 chassis are standard 19" rack mounting units and are built as either Mainframe or Expansion Chassis. From 128 to 2048 individual switch points are furnished. Input and output signal connectors are standard IDC Headers and are accessed from the chassis rear.

4600 MAINFRAME

The standard mainframe is built with power supplies, a Control Module and, optionally, a Manual Control. The system is completed by adding as required from one to sixteen of the 4600/8(2x8) Switch Modules shown on this bulletin's second page.

4600-E EXPANSION CHASSIS

The expansion chassis is identical to the mainframe in size and function. The expansion chassis, however, is built without a dedicated control module, manual control or power supplies. Instead, it is designed to be both powered and controlled by one of CYTEC's MESA Control Chassis detailed in the **MESA Bulletin**. Ribbon Expansion Cables connect the expansion chassis to the MESA.

CUSTOM CHASSIS

Custom configurations are available upon request. Most custom systems wire out the rear panel Input/Output connections to a required connector type that is different from the standard headers. This wiring is priced on the basis of labor and materials.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Material or Workmanship for a period of 5 years and that all switches are guaranteed for their rated operations as shown on the second page.

4600 Series Matrix w/one Switch Module Installed

CONTROL MODULES

IF-5 IEEE488/RS232 CONTROL MODULE

This module provides remote control via both RS232 Serial and IEEE488 Talk/Listen interfaces as detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This optional module allows control over a 10BaseT Ethernet Local Area Network via TCP/IP protocols as described in Applications Bulletin AP-5.

MANUAL CONTROL

MC-2 WITH LCD DISPLAY

This local control supplies a front panel Keypad and LCD Display that lets the operator control any switch and verify switch status.

VMCS

This Virtual Manual Control Software allows a remote operator using a PC to view matrix Status and control switches using a full Graphical User Interface.

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

4600 SERIES MAINFRAME

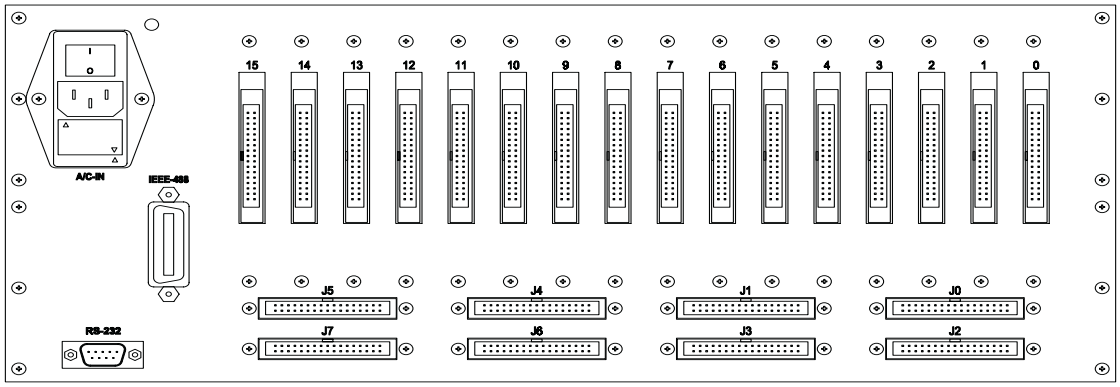


Fig. 1 4600 Mainframe Rear View

STANDARD MATRIX CONFIGURATIONS

One of several different possible matrix configurations can be supplied by jumpering the 4600/8(8x2) Switch Modules and/or the Chassis Motherboard as shown in **Fig. 2**. The matrix is passive and bidirectional, and any input can be routed to any output without interrupting previously connect I/O paths.

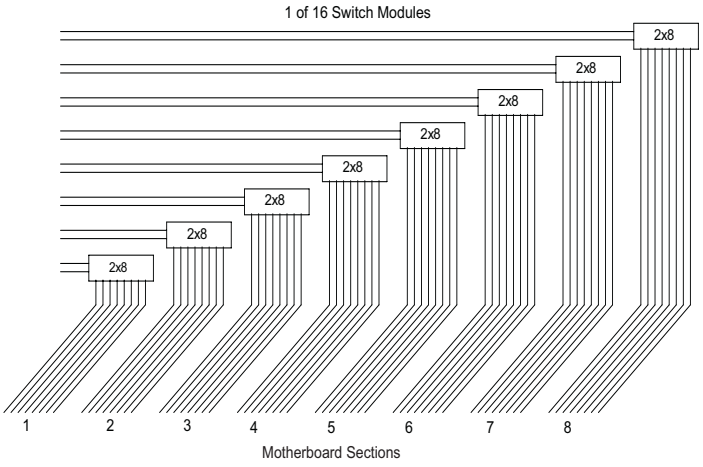


Fig. 2 Matrix Configuration Options

Each Switch Module is eight individual (8x1) two pole matrices. The Chassis Motherboard has eight, 8 pair trace sections. Presuming a full chassis holding 16 switch modules, any one the following configurations is possible:

Config.#	Jumpers	Jumpered Sect.	Matrix Size
1	None	None	8(32x8)
2	Motherboard	1,5 -2,6-3,7-4,8	4(64x8)
3	Motherboard	1,3,5,7 - 2,4,6,8	2(128x8)
4	Motherboard	1,2,3,4,5,6,7,8	256x8
5	Module	1,2-3,4-5,6-7,8	4(32x16)
6	Module	1,2,3,4 - 5,6,7,8	2(32x32)
7	Module	1,2,3,4,5,6,7,8	32x64
8	#6 + Drives	1,5-2,6-3,7-4,6	4 wire 32x32
9	#3 + Drives	1,2-3,4-5,6-7,8	4 wire 128x8
10	#2 & 5 + Drives	1,3-2,4-5,7-6,8	4 wire 64x16
11	#2 + Drives	1,2,3,4 - 5,6,7,8	8 wire 64x8
12	#5 + Drives	1,3,5,7 - 2,4,6,8	8 wire 32x16
13	#1 + Drives	1,2,3,4,5,6,7,8	16 wire 32x8

4600 SERIES SWITCH MODULES

Each Switch Module is assembled with a total of 128 two pole **Type A** relays. The module's basic configuration arranges the relays as eight separate 2x8 two pole matrices. However, individual 2x8's may be interconnected via built-in jumpers to furnish many different configurations as required. For example, jumpering all eight 2x8's creates a 2x64 two pole switch module, and installing the maximum of 16 switch modules into one chassis (with a standard motherboard) results in a 32x64 two pole matrix.

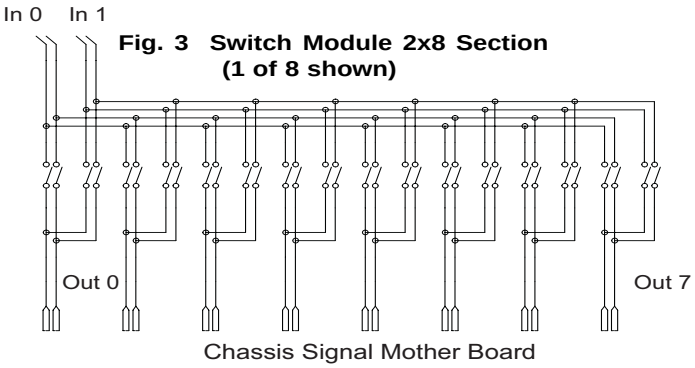


Fig. 3 Switch Module 2x8 Section (1 of 8 shown)

TYPE A RELAY SPECIFICATIONS

Contact Rating	30 VA
Switching Voltage	110 VDC
Switching Current	1.0 A
Carrying Current	1.0 A
Breakdown Voltage	750 VDC
Operate Time MSec	3
Lifetime (mechanical)	100 million cycles

GENERAL SPECIFICATIONS

Dimensions - 19" rack mounting, 7.0" high and 21" deep
Weight - less than 40 lbs. fully loaded with 16 switch modules
AC Mains - 115 VAC or 230 VAC, 47-400 Hz, 100 Watts
Operating Temperature - 0 to 50 deg. C.
Storage Temperatures - -25 to 65 deg. C.
Bandpass (-3 dB) - DC to 20 MHz for 32x64 two pole matrix

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

PX/512 SWITCH MATRIX

The PX/512 Series of Switching Matrices are compact and economically priced units using high reliability Reed Relay Modules assembled into pre-wired Mainframes or Expansion Chassis to assemble a 32x16 Matrix, two 32x8 Matrices or a 64x8 Matrix with either single or two pole signal switching. Computer Control can be from IEEE488 BUS, RS232 Serial or 10Base-T LAN.

SPECIAL FEATURES:

- **Matrix layout for high bandpass of 20 MHz and crosstalk less than -40 dB at 10 MHz.**
- **Status Feedback to the computer from the relay coil drive gives positive assurance that selected relay is energized.**
- **Interrogation Mode gives readout of all switched paths in terms of inputs and outputs connected.**
- **Optional Manual Control with visual display of selected switch path.**
- **Optional nonvolatile Ram for storage of preset or power-up configuration.**
- **VMCS Virtual Manual Control Software for Remote operation using a full Graphical User Interface.**

SWITCH MATRIX UNITS

The units are all 19" rack mounted Chassis, 3.5" high, pre-wired to accept up to 16 of the PX/32 Switch Modules and a Control Module. Signal inputs and outputs are available with either coaxial BNC receptacles (-N), Header type connectors (-H) or screw terminals (-S).

MAINFRAMES

These are stand alone pre-wired chassis with low noise power supplies and motherboards to accept 16 Switch Modules and a Control Module.
There are two basic series of Mainframes:

PX/512-1 MAINFRAMES

These are 16" deep chassis pre-wired for single pole switching matrices.
PX/512-1A has a pre-wired motherboard accepting 16 of the PX/2x16-1 Switch Modules in a 32x16 Switch matrix configuration.
PX/512-1B has a pre-wired motherboard accepting 16 of the PX/2(2x8)-1 Switch Modules in two separate 32x8 matrices which can be combined as one 64x8 matrix.

PX/512-2 MAINFRAMES

These are 21" deep chassis pre-wired for two pole switching matrices.
PX/512-2A has pre-wired motherboards accepting 16 of the PX/2x16-2 Switch Modules in a 32x16 matrix configuration.
PX/512-2B has pre-wired motherboards accepting 16 of the PX/2(2x8)-2 Switch Modules in two separate 32x8 matrices which can be combined as one 64x8 matrix.

EXPANSION CHASSIS

These units are pre-wired to accept 16 Switch Modules and an Expansion Interface Module so that several chassis can be controlled and receive power from one MESA Control Unit as shown in the MESA Bulletin.
These Expansion Chassis are available in the same matrix configurations as the Mainframes.

PX/512-E-1 EXPANSION CHASSIS

These are 16" deep chassis accepting single pole switch modules.
PX/512-E-1A has a 32x16 matrix configuration.
PX/512-E-1B has two 32x8 matrices which can be combined as one 64x8 matrix.

PX/512-E-2 EXPANSION CHASSIS

These are 21" deep chassis accepting two pole switch modules.
PX/512-E-2A has a 32x16 matrix configuration.
PX/512-E-2B has two 32x8 matrices which can be combined as one 64x8 matrix.

CUSTOM CHASSIS

The Mainframes and Expansion Chassis can be supplied wired out to customer specified connectors or in special configurations.

PX/32 SWITCH MODULES

Each switch module has 32 single or two pole relays and includes the logic for Selecting the module, Selecting and Latching the relay and obtaining the Status of the relay. Status is obtained by checking the drive to the relays which verifies that the logic is operating correctly and that the selected relay is energized.

SINGLE POLE SWITCH MODULES

These Modules are available as either 2x16 Matrices or two 2x8 Matrices and with either Type S dry reed relays or Type M mercury wetted reed relays.
The inputs to the modules can be either BNC connectors(-N), screw terminals(-S) or 16 pin header (-H) for signal and shield, and the shield is carried through the module for maximum signal isolation.
The module outputs go to the 50 pin card edge connector which plugs into the motherboard bussing the modules into the matrix configuration.

PX/2x16-1 SWITCH MODULE

This is a 2x16 Switch Module shown in **Fig. 1** with two input connectors and 16 outputs on the card edge connector.

Sixteen of these modules can be assembled in the PX/512-1A Chassis to make a 32x16 Matrix as shown in the single pole version of **Fig. 5**.

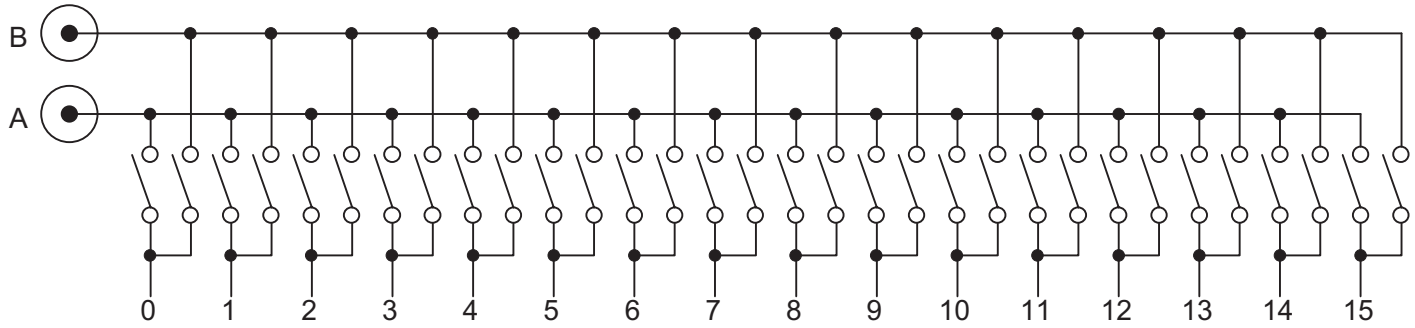


Fig. 1 PX/2x16-1 Switch Module

PX/2(2x8)-1 SWITCH MODULE

This module has two 2x8 Matrices as shown in **Fig. 2** with 4 input connectors and two sets of 8 outputs on the card edge connector.

Sixteen of these modules can be assembled in the PX/512-1B Chassis to make two separate 32x8 Matrices or bussed on the motherboard as shown in the single pole version of **Fig. 6** to make one 64x8 Matrix.

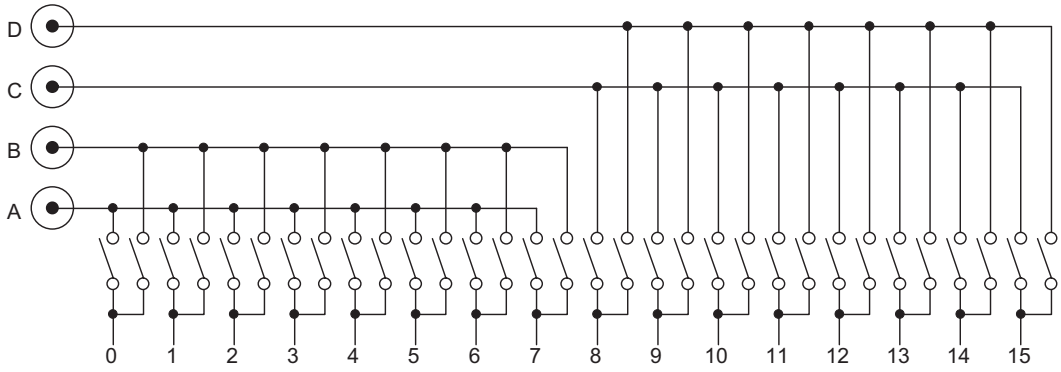


Fig. 2 PX/2(2x8)-1 Switch Module

TWO POLE SWITCH MODULES

These Modules are available as either 2x16 Matrices or two 2x8 Matrices and with either Type S dry reed relays, Type M mercury wetted reed relays or Type LT low thermal relays.
The inputs to the modules can be either BNC receptacles (-N), 20 pin headers (-H) or screw terminals (-S).
Both the center conductor and isolated shield of the BNC are switched. The 20 pin header or screw terminals can be used for shielded twisted pair cables where the signal pair is switched and the shield is carried through the matrix.
The module outputs go to two 25 pin card edge connectors which plug into two motherboards bussing the modules into the matrix configuration.

PX/2x16-2 SWITCH MODULE

This is a 2x16 Switch Module shown in **Fig. 3** with two input connectors and 16 outputs on two card edge connectors.

Sixteen of these modules can be assembled in the PX/512-2A Chassis to make a 32x16 Matrix as shown in **Fig. 5**.

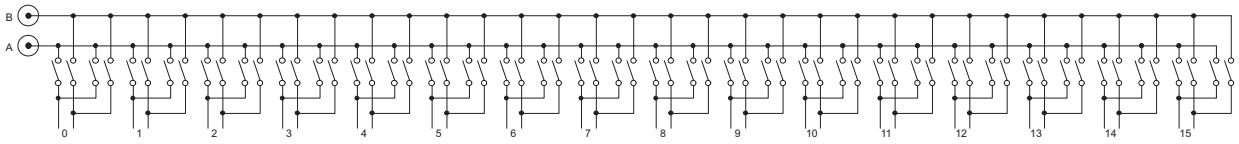


Fig. 3 PX/2x16-2 Switch Module

PX/2(2x8)-2 SWITCH MODULE

This module has two 2x8 Matrices as shown in **Fig. 4** with 4 input connectors and two sets of 8 outputs on the card edge connector.

Sixteen of these modules can be assembled in the PX/512-2B Chassis to make two separate 32x8 Matrices or bussed on the motherboard as shown in **Fig. 6** to make one 64x8 Matrix.

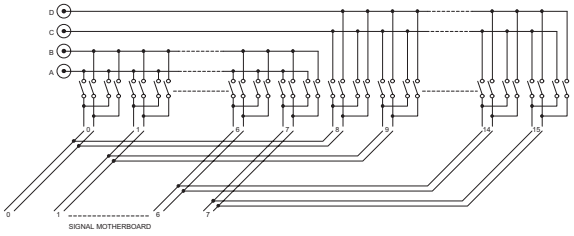


Fig. 4 PX/2(2x8)-2 Switch Module

MATRIX CONFIGURATIONS

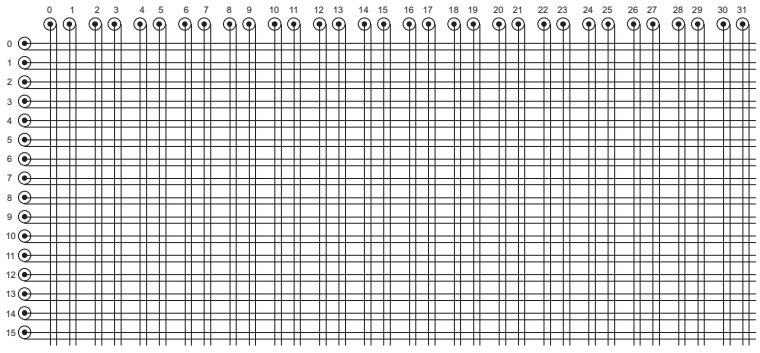


Fig. 5 32x16 Matrix

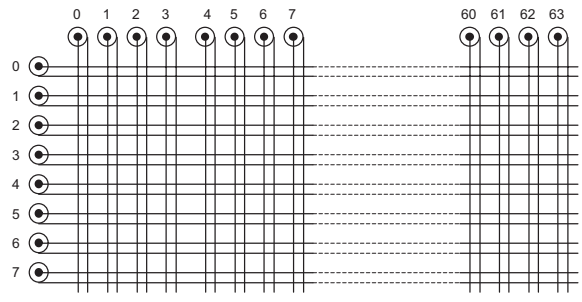


Fig. 6 64x8 Matrix

SWITCH SPECIFICATIONS

Three types of switches are available, the Type S, Type M and Type LT.

Type S Standard is a dry reed switch for most medium range applications.

Type M Mercury is a mercury wetted switch for high power or low contact resistance applications.

Type LT Low Thermal is a dry reed switch for low level applications with less than 1 microvolt offset.

All switches are guaranteed for 100 million operations when used within the following specifications:

	Type S	Type M	Type LT
Contact Rating	10VA	50VA	10VA
Maximum Switch Voltage	200V	500V	100V
Maximum Switch Current	0.5A	2A	0.2A
Breakdown Voltage	400V	1000V	200V
Operate Time, less than	1ms	2ms	1ms

MATRIX SPECIFICATIONS

The Matrices are designed for maximum bandpass and isolation between channels.

All test results are on a full chassis of 16 modules with 50 ohm source and 50 ohm termination.

32x16 MATRICES

- Bandpass DC to 20 MHz
- Isolation -40dB at 10 MHz
- Crosstalk -30dB at 10 MHz

64x8 MATRICES

- Bandpass DC to 10 MHz
- Isolation -40dB at 10 MHz
- Crosstalk -40dB at 10 MHz

GENERAL SPECIFICATIONS

Power - 100-130 Volts AC or 200-240 Volts AC, 50 to 60 Hz, 100 W.

Environment - Operating Temperature 0^0 to 50^0 C.
Storage Temperature -25^0 to 65^0 C.

CONNECTOR OPTIONS

The Modules and Chassis are available with the following options selected by the suffix at the end of the Model Number:

-N Indicates the BNC receptacles with isolated shield for two pole switching and ground shield for single pole switching.

-H Indicates header connectors, with 16 pin headers for the single pole modules and 20 pin headers with two wire plus shield for two pole switching.

-S Indicates terminal with screw terminal mates which have two terminals for the single pole modules and three terminals for two pole modules.

-W Indicates special wiring to customer specification.

CONTROL MODULES

Plug in Modules control the PX/512 Mainframes from the IEEE488 Bus or the RS232 Serial Port.

The Controls can Select and Latch or Unlatch any Switch in the Matrix. The controls can also request the Status of any Switch or can Request the Status of the complete Matrix.

The cycle time to Select and Latch a relay and obtain status is 30 msec.

IF-5 IEEE488/RS232 COMBINED MODULE

This Module combines all the features of the RS232 Serial and IEEE488 GPIB Bus Modules detailed in the **Applications Bulletin AP-5**.

IF-6 LAN INTERFACE

This module interfaces between the Local Area Network and the RS232 Control Modules using TCP/IP commands as described in the **Applications Bulletin AP-5**.

MC-2 MANUAL CONTROL

This Manual Control has a Keypad and LCD Display on the front panel so that the operator can select any relay and Latch the Relay or check the Status of the Relay on the Display.

CYTEC SWITCH MANAGER SOFTWARE

The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager from our website.

Available for Windows, Linux, Mac OS, or any other Java enabled platform

RAM OPTION

This option is available with the above Control Modules and with the MESA Control Unit.

Switch selections can be stored in a battery back up RAM so that the switches can be latched to a preset configuration up to 1000 switch selections.

After power loss, the switch matrix will reset to the last selected switch configuration.

SOFTWARE

Drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Workmanship and Materials for a period of five years and that all switches are guaranteed for their Rated Operations.

FOR TECHNICAL ASSISTANCE CONTACT 1-800-346-3117 or WWW.CYTEC-ATE.COM.

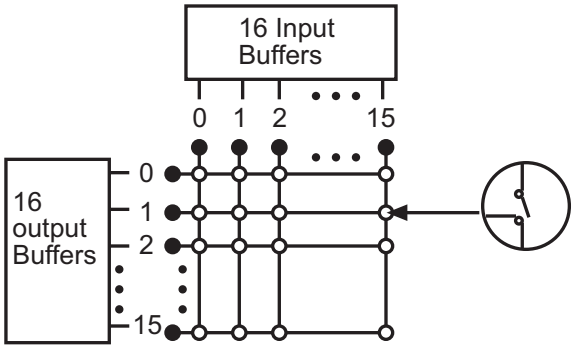
2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

DXM/64x64 and DXM/128x128 SERIES
SOLID STATE HIGH SPEED DIFFERENTIAL DATA SWITCHING MATRICES for ECL, PECL, CML & More

CYTEC's DXM Series switching systems are solid state, full fan-out matrices available in 16x16 through 128x128 configurations. At the switch fabric level, CML Inputs are switched to CML Outputs. Input and Output Buffers are added to allow ECL, PECL, LVPECL, LVDS or fast RS422 two wire differential signal switching. CML supports data rates to 3.2 Gbps. Other data rates are as high as 2 Gbps (NRZ). Control is via the new IF-8 RS232/GPIB/Ethernet Control Module.

TYPICAL APPLICATIONS INCLUDE:

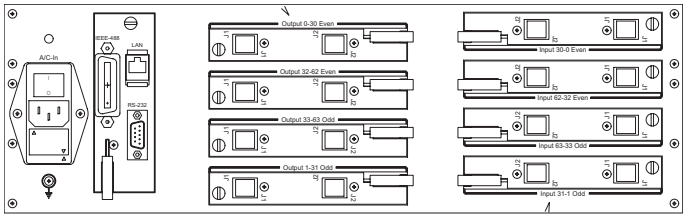
- **Programmable routing of fast differential signals for telemetry applications.**
- **Signal distribution for communications and test.**
- **Automated patch panels.**



16x16 Matrix with optional Input and Output Buffers

SYSTEM HIGHLIGHTS:

- **Matrices are non-blocking and full fan out.**
- **64x64 and 128x128 chassis sizes are offered.**
- **Modular design - Systems can be configured in increments from 16x16 to 128x128 matrix sizes.**
- **Different buffer modules provide for signal transformations; i.e., ECL Inputs and LVDS Outputs.**
- **Clock/Data configurations available.**
- **Buffer and control modules are hot-swappable.**
- **Control via IEEE488, RS232 & Ethernet all standard.**
- **Firmware upgrades can be downloaded from Cytec's web site.**
- **Chassis' Densi-Shield I/O connectors can be wired out to patch panels with SMAs, BNC, etc.**
- **Switch fabric cleans up signal jitter and rise times.**



DXM/64x64 Mainframe Chassis

DXM CHASSIS

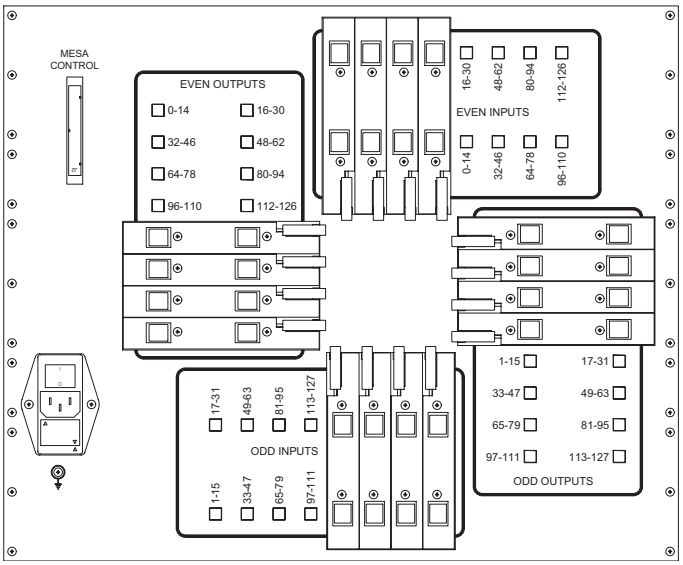
The DXM Chassis are standard 19" rack mounting anodized aluminum chassis that are built with RS232, IEEE488 and Ethernet controls. Any input connects to any or even all outputs. Systems switching Clock & Data pairs are also available. Densi-Shield input and output connectors are standard, while other connectors such as SMA or BNC can be wired out on patch panels.
The following chassis are offered:

DXM/64x64 Mainframe- 5.25" high (3U) and 15.6 " deep. Configurations range from 16x16 to 64x64 matrices.
DXM/32x32 Clock/Data Mainframe - also a 5.25"high and 15.6" deep chassis. Switches Clock & Data signals together in parallel. Available as 16x16 or 32x32 matrices.
DXM/128x128 Mainframe- 14" high (8U) and 15.6 " deep. Configurations from 16x16 to 128x128 are offered.
DXM/64x64 Clock/Data Mainframe- Switches Clock & Data signals together as pairs. 8U by 15.6" deep. Available in configurations ranging from 16x16 to 64x64 matrices.
DXM-E Expansion Chassis - are used to build larger systems. Multiple DXM Chassis can be controlled from one MESA II Control Chassis shown as in the **MESA Bulletin.**

Custom configurations are available on request.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

SPECIFICATIONS AND BUFFER OPTIONS



DXM/128x128 Expansion Chassis with Densi-Shield Signal Connections

DXM SERIES MATRIX

The DXM Series switches high speed differential signals such as ECL, PECL, CML, LVDS, RS422 in a nonblocking (any input to any output) and full fan out (any input to any or all outputs) configuration. A solid state switch fabric is at the heart of the system. The basic chassis holds the control module, power supplies and switch fabric. The system is completed by adding the required input and output buffers. The buffers provide signal level transformations for the different signal types.

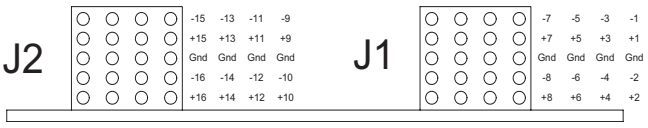
INPUT and OUTPUT BUFFER MODULES

The DXM Series switching systems are built with input and output buffer modules. Buffer modules are required to convert external signals (such as ECL, PECL, LVDS, etc.) to CML levels that can be handled by the solid state fabric at the heart of the switch. The switch fabric outputs CML levels which are then converted by the output buffers back to the original signal, or to a different signal type (i.e., ECL in to LVDS out) if required by the end user.

Each buffer module handles 16 differential signals. Thus, for a 16x16 configuation, one input and one output buffer module are required. Similarly, four input and four output buffer modules are needed for a 64x64 matrix, while eight of each are needed for a 128x128.

FCI DENSI-SHIELD I/O CONNECTORS

Each buffer is built with two Densi-shield connectors, and each connector handles eight differential pair signals as shown below. These connectors can be wired out to optional patch panels that provide BNC, SMA, Triax, etc., connectors.



Buffer Module Densi-Shield Connectors

INPUT/OUTPUT BUFFER SPECIFICATIONS

CML INPUT/OUTPUT BUFFER MODULES

The CML Input Module AC couples all inputs and provides pull up circuits to prevent unused inputs from floating and picking up crosstalk from live adjacent signals. CML Output Modules accept CML signals from the switch matrix crosspoint IC and pass them on to the output Densi-Shield connectors.

SPECIFICATIONS

Max. Data Rate (NRZ)	3.2 Gbps
Vdiff - Input Diff. Vpp	0.2 V min., 2.0 V max.
Vodiff - Output Diff. Vpp	0.5 V min., 0.8 V max.
Channel Propogation Delay	3.8 nsec. typ., 4.25 nsec max.
Ch-Ch Propogation Skew	75 psec typ., 125 psec max.

FAST RS422 OUTPUT BUFFER MODULES

These modules are inteneded to work with typical RS422 signal levels of 0 to 5 volts. Differential signals terminate into 100 ohms across differential pairs. Vcc is typically 3.5 V for the inputs and 5 V for the output modules.

SPECIFICATIONS

Max. Data Rate (NRZ)	60 Kbps min., 40 Mbps max.
Voh - Output V High	3.4 V min.
Vol - Output V Low	0.4 V max.
Channel Propogation Delay	3.8 nsec. typ., 4.25 nsec max.
Ch-Ch Propogation Skew	75 psec typ., 125 psec max.

LVDS OUTPUT BUFFER MODULES

Work with typical LVDS signal levels of 1 to 1.4 volts. Differential signals terminate into 100 ohms across differential pairs. Vcc is approximately 3.0 V.

SPECIFICATIONS

Max. Data Rate (NRZ)	60 Kbps min., 1.6 Gbps max.
Voh - Output V High	1.474 V max.
Vol - Output V Low	.925 V min.
Vocm - Output Com Mode V	1.125 V min., 1.375 V max.
Vodiff - Output Diff. V	250 mV min., 450 mV max.
Channel Propogation Delay	3.8 nsec. typ., 4.25 nsec max.
Ch-Ch Propogation Skew	75 psec typ., 125 psec max.

ECL OUTPUT BUFFER MODULES

ECL modules are intended to work with typical ECL signal levels of -1.8 to -0.8 volts. Differential signals terminate into 50 ohms tied to -2 V. Vee is usually -5 V, while Vcc is GND.

SPECIFICATIONS

Max. Data Rate (NRZ)	60 Kbps min., 3.0 Gbps max.
Voh - Output V High	-0.810 V max.
Vol - Output V Low	-1.950 V min.
Io Output Current Continuous	50 mA
Channel Propogation Delay	3.8 nsec. typ., 4.25 nsec max.
Ch-Ch Propogation Skew	75 psec typ., 125 psec max.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

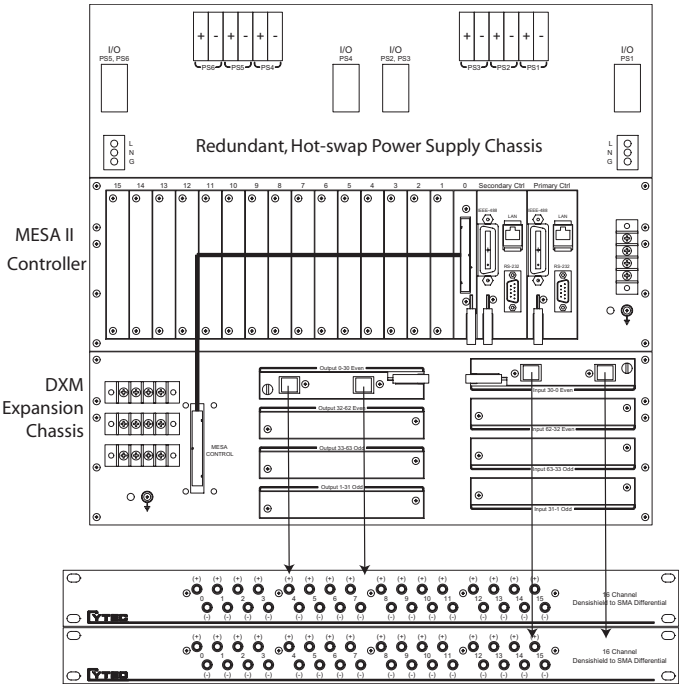
CONTROL & POWER SUPPLY REDUNDANCY/HOT SWAPPABLILITY

MESA II CHASSIS w/ Redundant Controls

The MESA II is a 19" rack mounting chassis, 5.25" high and 15" deep. It accepts one or two of the CM-8 IEEE488/RS232/Ethernet Control Modules and also has expansion ports that control up to 16 expansion chassis. All three remote interfaces can be in use at the same time. The MESA II is optimized to control several large solid state expansion chassis, such as the DXM and DX/256x256 Series.

Redundant, Hot Swappable Controls

The MESA II can hold two of the hot swappable CM-8 IEEE488/ RS232/Ethernet LAN Control Modules. Two control modules provide for redundancy, increasing system availablitly.


Redundant, Hot-swap Power Supply Chassis
MESA II Controller
DXM Expansion Chassis
16 Channel Densishield to SMA Differential
16 Channel Densishield to SMA Differential

DXM 16x16 system consisting of one DXM expansion chassis, one MESA II with redundant controls and a redundant power supply chassis. SMA connectors are wired out on a separate Patch Panel.

REDUNDANT/HOT SWAPPABLE POWER SUPPLY CHASSIS

The DXM Series chassis are powered by either standard internal power supplies or optionally via externally located rack mounting power supply chassis. Each rack mounting power chassis holds several plug in, hot swappable power modules, with at least two redundant modules supplying each required voltage. The separate rack mounted power supply chassis increases system availablity by furnishing supplies that are both redundant and hot swappable. (See adjacent image)

DXM EXPANSION CHASSIS

DXM chassis can be built as expansion chassis and used with Cytec's new MESA II Control Chassis. Expansion chassis allow large or complex systems to be set up using a single point of control. Using a Mesa II Controller and one or more expansion chassis has the following advantages:

Cost Savings

Expansion chassis do not require their own control modules or manual controls, adding up to cost savings that pay for the MESA on any system requiring three or more expansion chassis.

Single Point of Control

You can control up to 16 DXM chassis, or combinations of different chassis types, from a single MESA II. The MESA allows control of several chassis from one GPIB address, RS232 Port or LAN IP address.

Remotely Located Switch Chassis

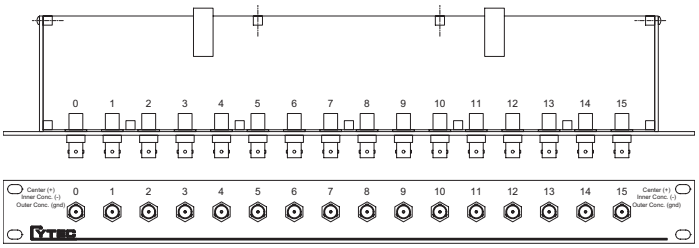
Expansion chassis can be located up to 125 feet away from the MESA. Thus switching chassis can be located where needed and still not require separate controls.

Complex Test Systems

Since any Cytec chassis can be controlled via the MESA, you can build complicated systems switching a number of different signal types by using different Cytec products for each signal type.

CONNECTORIZED PATCH PANEL OPTIONS

The DXM series chassis have I/O buffer modules that are built with high density Densi-shield connectors. These native connectors can be wired out to other common types including SMAs, BNCs, Triax, etc., located on separate rack mounting patch panels. (See adjacent image for a 16x16 matrix system using patch panel mounted Triax connectors)



48-23-10 16 channel Triax Patch Panel

Patch Panels allow you to connect and disconnect the switch quickly without disturbing the SMA, BNC or Triax Connections greatly reducing MTTR and long term MTBF.

Cytec can produce patch panels with almost any connector desired. Don't see it? Just call and ask!

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

DXM GENERAL SPECIFICATIONS

Connections	Densi-Shield signal connections, AC input and remote control input. Optional signal connectors such as SMA, BNC and Triax are available on wired-out patch panels.
Control	RS232, IEEE488 and Ethernet all standard. Manual keypad optional.

ENVIRONMENTAL

Dimensions/Weight	19' rack mount, less than 45 lbs
- DXM/64x64	5.25" high x 15.6" deep
- DXM/128x128	14" high x 15.6" deep

POWER

AC Input	90-264 volts AC, 47-63 Hz, < 100 W typical
DC Supply Type	High efficiency switching

SIGNALS

Capacity	
- DXM/64x64	Up to 64x64 Matrix OR 32x32 Clock/Data configuration
- DXM128x128	Up to 128x128 Matrix OR 64x64 Clock/ Data configuration
- Expansion	Mesa Controller allows expansions up to 128x128 Clock and Data or higher.
Switch Fabric	Vitesse VSC3138/VCS3140 crosspoint ICs CML inputs, CML outputs. Data rate to 3.5 Gbps NRZ helps restore signal levels, corrects deterministic jitter and rise time problems associated with long cable runs.

MISCELLANEOUS

Switching Speed	100 ns plus any computer delay
MTBF	50,000 hours (Telcordia)

ALL CHASSIS

Material: Gray anodized extruded or sheet aluminum
Mounting Hardware: Rack mount handles are standard Flush mount flanges available at no extra cost.
AC Power: Autoranges from 90 - 264 VAC at 47-63 Hz

SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

CONTROL OPTIONS

IF-8 IEEE488, RS232 & ETHERNET LAN

Are standard for DXM Mainframes. All interfaces may be active and in use simultaneously. Setup information is stored in NVRAM, which allows the system to be configured for various matrix addressing conbinations which are then remembered. The IF-8 may be removed without affecting the switch state. However, installing an IF-8 will cause the system to clear and reset.

CM-8 MESA II CONTROL MODULE

The CM-8 installs in the MESA II Control Chassis ONLY and has three remote control interfaces: RS232 via a D9 connetor, IEEE488 Talk/Listen and 100BaseT Ethernet via a RJ45 45 port. All interfaces can be active at the same time. As an option, two CM-8's can be installed in the MESA II, with one Control Module designated the Primary and the second designated as the Secondary controller. The control modules are hot swappable, meaning they can be removed and then replaced without shutting down the MESA or the full switching sytem. Network parameters can be set up via any of the remote interfaces.

Control is via the same commands shown in the CM-5 Control Module section.

MANUAL CONTROL OPTIONS

MC-2 Keypad Manual Control

This optional front panel control includes a keypad and LCD display. The operator can open, close and verify the status of any switch point.

CUSTOMIZED SYSTEMS

Cytec can generally customize a system to meet specific requirements with little or no additional Non-Recurring Engineering (NRE) charges. Typical customiztions include: special labeling, configurations, chassis dimensions and mounting options or componets. Don't see what you need? Contact Cytec and one of our Sales Engineers will be happy to work with you.

CYTEC SWITCH MANAGER SOFTWARE

The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager free of charge from our website.

Available for Windows, Linux, Mac OS, or any other Java enabled platform

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

2555 Baird Road Penfield, New York 14526 • cytec-ate.com • (800)346-3117 • (585)381-4740

DX/256x256 SERIES

SOLID STATE DIGITAL SWITCHING SYSTEMS

CYTEC's DX/256x256 Series Switching Systems are based on a solid state switch fabric. The Standard DX system is designed to switch TTL, CMOS, LVTTL, IRIG, RS232 and RS422. Input and output buffers are used to convert to RS422 and/or RS232 signal levels. The DX is capable of switching data rates to 80 Mbps NRZ. The DX Matrix is a non blocking, full fan-out configurations from 64x64 up to 256x256. Control options include RS232/ IEEE488, LAN or LCD Keypad Manual Control.

DX/256X256 CHASSIS

The DX/256X256 Series are 19" rack mounting units and are built as either Mainframe or Expansion Chassis. The Solid State Digital Matrix is modular, capable of being expanded from a 64x64 to a 256x256 by adding the desired number of input and output modules. The configurations occur in 64 channel increments so typical configurations will be 64x128, 128x384, 256x64, etc. Other possible configurations such as dual 32x32 clock and data matrices or multi chassis clock and data systems are also available. The DX Series Matrix is completely non blocking and full fan-out.

DX/256x256 Mainframe Rear View

DX/256X256 MAINFRAME

The Standard Mainframes are built with power supplies, user specified Control Module and optionally Keypad LCD Display Manual Control. The system is completely modular by adding the desired number of DX/64 Input and Output Switch Modules defined on page 2 of the bulletin.

DX/256x256-E EXPANSION CHASSIS

The expansion chassis is identical to the mainframe in size and function. The expansion chassis, however, is built without a dedicated control module, manual control or power supplies. Instead, it is designed to be both powered and controlled by one of CYTEC's MESA Control Chassis detailed in the **MESA Bulletin**. Ribbon Expansion Cables connect the expansion chassis to the MESA.

CUSTOM CHASSIS

Custom configurations are available upon request. Most custom systems wire out the rear panel Input/Output connections to a required connector type that is different from the standard 64 pin male header or 78 pin female D Connectors. This wiring is priced on the basis of labor and materials.

CONTROL MODULES

IF-5 IEEE488/RS232 CONTROL MODULE

This module provides remote control via both RS232 Serial and IEEE488 Talk/Listen interfaces as detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This optional module allows control over a 10BaseT Ethernet Local Area Network via TCP/IP protocols as described in Applications Bulletin AP-5.

MANUAL CONTROL

MC-2 WITH LCD DISPLAY

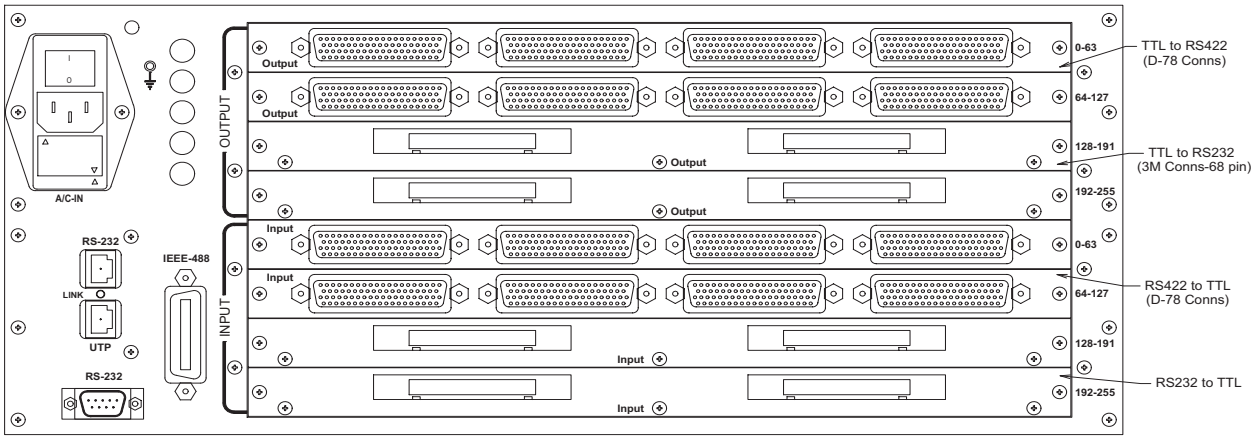
This local control supplies a front panel Keypad and LCD Display that lets the operator control any switch and verify switch status.

VMCS

This Virtual Manual Control Software allows a remote operator using a PC to view matrix Status and control switches using a full Graphical User Interface.

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM
FOR TECHNICAL ASSISTANCE

SPECIFICATIONS AND BUFFER OPTIONS



DX/256x256 Mainframe Rear View with IEEE488, RS232 and LAN Control
Shown with RS422 and RS232 Buffer Modules

DX/256x256 SERIES MATRIX

The DX Series is intended to switch almost any digital stream data stream in a non blocking (any input to any output without disturbing previously set paths), full fan out (any one input to any or all outputs) configurations. The Basic system is intended to switch TTL or CMOS signal levels.

When used without buffer modules, the system conforms to all TTL/ LVTTL specifications below

DX SPECIFICATIONS (signal w/o buffers)

Input Voltage High (VIH) :	2.1V Min	5.25V Max
Input Voltage Low (VIL)	-0.3V Min	0.8V Max
Output Voltage High (VOH)	2.4V Min	3.7V Max
Output Voltage Low (VOL)	---------	0.4V Max
Data Rate	---------	80Mb/s Max
Output Current	---------	8 mA Max

CONNECTIONS

Signal Connections:

64 pin Headers or 78 pin female D connectors. Patch panels can be provided to convert 64 pin headers or 78 pin female "D" to BNC, SMA or customer specified connector.

AC Input:	Universal, US Standard AC
RS232:	D9 Male
GPIB:	IEEE488
10BaseT LAN:	RJ45
LAN to RS232:	RJ45

GENERAL SPECIFICATIONS

Dimensions - 19" rack mount, 7" (4U) high and 20" deep
Weight - <45 lbs (20.41 Kg)
AC Input - 100 to 130 VAC or 200 to 260 VAC, 47/63 Hz,
Operating Temperature - 0 to 50 ºC
Storage Temperatures - -25 to 65 ºC
Switching Speed - 50 ns + Control Interface Delay
Humidity - 95% RH non condensing to 30º C

INPUT and OUTPUT BUFFERS

Optional Input and/or output buffer modules convert the system to RS422 and/or RS232 levels. Each buffer module has sixty-four (64) channels so a fully buffered 256x256 system has four input buffers and four output buffers. When these modules are used, the specifications of the system are determined by the input and/ or output buffers present.

The RS422 input and output buffer modules have two options for connectors, 68 pin male header or 78 pin female "D" connector.

DX SPECIFICATIONS (signal with buffers)

RS422 Input Buffer Characteristic:	
Common Mode Input Voltage (Vcm)	-7V<Vcm<+7V
Differential Voltage Swing	200 mV Min
Input Resistance	6.8 KOhm Typical
Data Rate	20 Mb/s Max
RS422 Output Buffer Characteristic:	
Common Mode Output Voltage	1.8V Typical
Output Voltage High (VOH)	2.5V Min /3.4V Max
Output Voltage Low (VOL)	.3V Typical /.5V Max
Data Rate	20 Mb/s Max
Output Current	150 mA Max
RS-232 Input Buffer Characteristic:	
Input Voltage Range	-25V Min /+25V Max
Input Voltage High (VIH)	2.17V Min
Input Voltage Low (VIL)	1.06V Max
Data Rate	200 kb/s Typical
Input Resistance	5.0k Ohms Typical
RS-232 Output Buffer Characteristic :	
Output Voltage High (VOH)	+5V Min /+8V Max
Output voltage Low (VOL)	-8V Typical /-5V Max
Data Rate	120 kb/s Typical
Output Current	±10mA Typical

WARRANTY

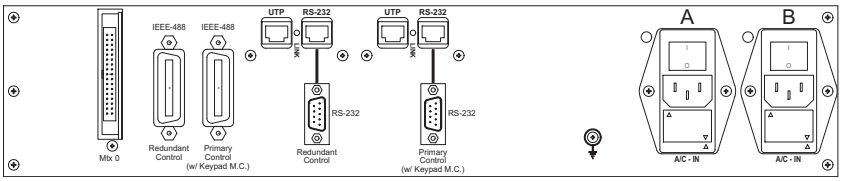
CYTEC Corp. warrants that all products are free from defects in Material or Workmanship for a period of five years

OPTIONS

Control Options

Single Chassis Mesa Controller with Redundant Supplies and Controls

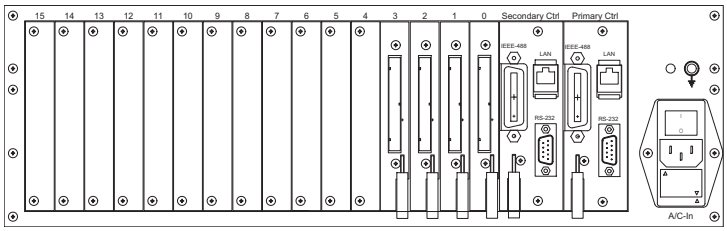
- Allows for redundant supplies but not hot swappable.
- Allows for redundant controls on a single DX chassis.
- Allows for remote Power Supply monitoring.



Single Chassis Mesa Controller P/N 16-13-00

MESA II Modular Controllers

These controllers allow you to run multiple DX/256x256 Expansion Chassis from a single point of control and provides the following benefits:



- Configuration of multiple chassis larger than 128x128, driven in parallel for Clock and Data systems.
- Allows for modular redundant control modules to increase MTBF and decrease MTTR.
- Allows for power supply status remote monitoring.
- Provides a single point of control for multiple chassis.
- CM-8 Interface allows IEEE488, RS232 and 100BaseT Ethernet LAN with two TCP/IP ports.

Hot Swap Power Supply Option

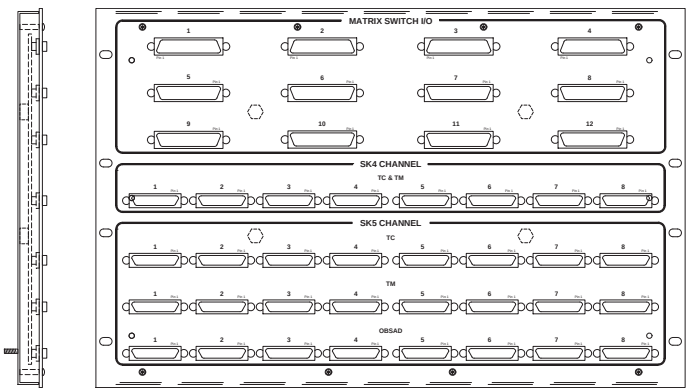
All power supplies are either universal 90 to 260 VAC input or selectable 110 / 220.

19" rack mount modular power supplies. These supplies allow you provide redundant hot-swappable power supply modules for each DC voltage. Supplies are diode isolated to share the load unless one supply fails. Failure results in an alert LED or can be setup to trigger an alarm. Power supply status monitor option for the Mesa control chassis allows you to remote monitor the supply status.

Buffer Options

Custom Buffer Modules can be built to switch any type of serial data below 80 Mbps NRZ. E-mail or call us with your specs for a quote on custom buffer modules.

Custom Patch Panels

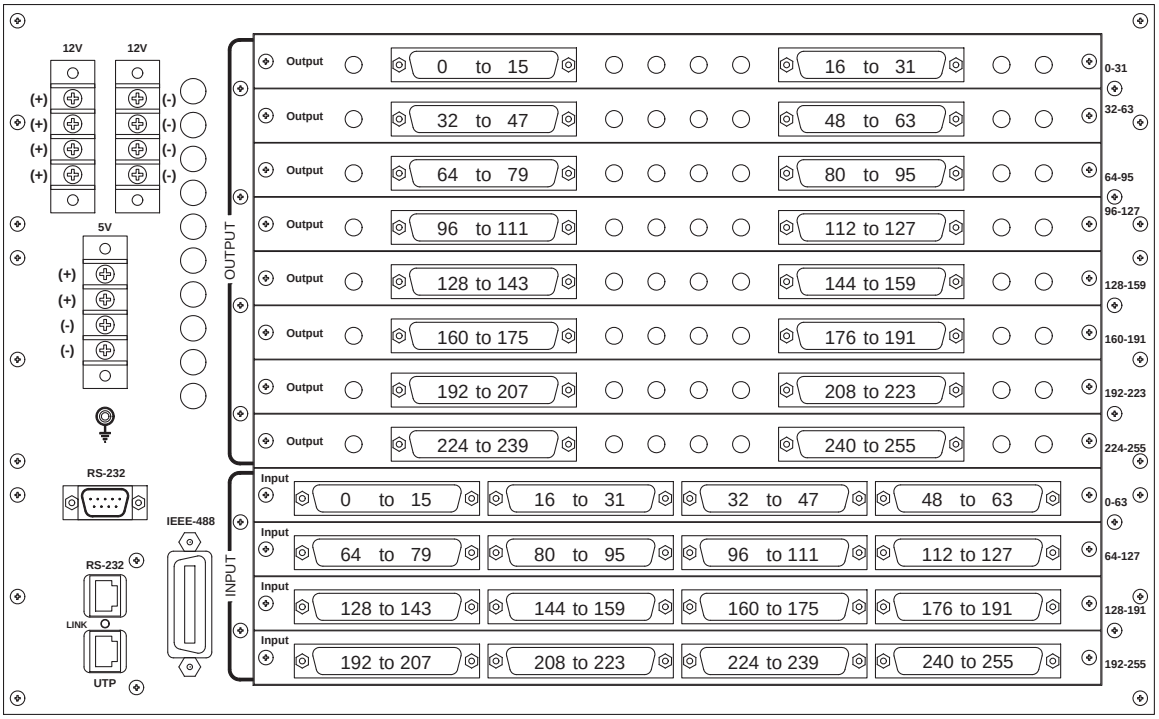


Cytec can produce custom patch panels with almost any type of connector to interface between your cables and the connectors on our buffer modules. Call or e-mail your specs for details.

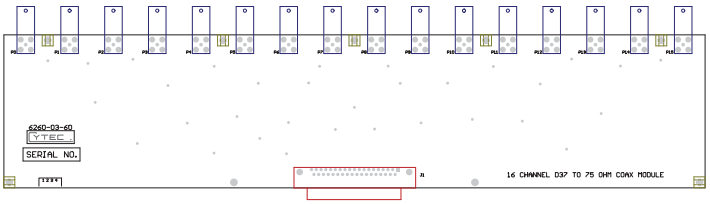
Model 5215 Patch Panel converts D78 connectors to D25 connectors with a specific pin-out for RS422 Clock and Data Pairs.

Need a custom system? No problem! Here's a good example:

Model 6260 DX/256x256 75 ohm TTL Matrix



Cytec can modify existing designs to build systems that do exactly what you need. The Model 6260 is a modified version of the DX/256x256 that is used to switch 75 ohm TTL signals up to 40 Mbps NRZ. The Input buffers are terminated into 75 ohms and are able to withstand +/- 15 vpp signal surges. The output buffers are capable of driving +4.8 V TTL signals into a 75 ohm load over 200 feet of coax cable with only a 0.4 volt drop. The rise time at the output is 2.8 ns increasing to 7 ns at the end of 200 feet of coax. All outputs are short circuit protected.



16 channel D37 to BNC Patch Panel Module

The system was provided with D37 to 75 ohm BNC patch panel modules shown above. These modules were mounted onto 19" rack mount panels with custom labeling.

The system was provided to run on DC power and then a 19" rack mount Kepco Power Supply chassis was used. The rack mount power supplies provided hot-swap, redundant, modular power for all voltage levels with warning LED's.

An Optional Mesa Controller is available with redundant control modules and power supply sense modules that allow the supply status to be monitored remotely.

Don't see what you need? Call or e-mail us.
Cytec can provide fully custom systems with little to no NRE and back them all up with a 5 year warranty.

1-800-346-3117 **sales@cytec-ate.com** **585.381.4740**

CYTEC CORP.

BULLETIN
GX-3

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

GX SERIES

GROUP SWITCHING MATRICES and MULTIPLEXERS

Standard CYTEC Switch Modules are available that can switch 8, 16 or 32 signal wires simultaneously. These modules can be custom configured as Group Switches to handle large number of signals per switched crosspoint.

GROUP MULTIPLEXERS switch any one of several Groups of Input signals to a single Output Group, or the reverse, that is, one Input Group to one of several Output Groups.

GROUP MATRICES switch selected Groups of Inputs to selected Output Groups in an NxM matrix configuration.

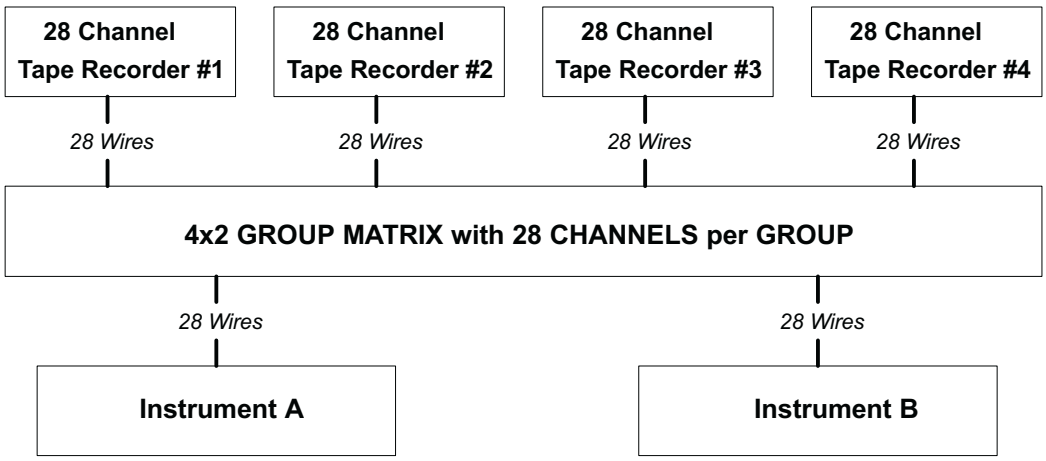
Remote computer control via IEEE488 and RS232 is standard. Optional computer controls include Parallel TTL, Ethernet LAN and USB. Manual Controls are also optionally available on both the GX Mainframes or the GX Control Units.

The Group Switch concept is best illustrated by a practical application such as the one shown below.

DATA ANALYSIS SYSTEM

Vibration Data collected on four Tape Recorders are to be analyzed by two Instruments. Each Tape Recorder has 28 channels. All 28 channels from any of the four Tape Recorders must be switched as a group to either of the two Instruments as shown below. The data frequency is 0 to 300 kHz, and the wiring is coaxial cable with BNC connectors.

The switch module selected is the **LX8B/4x2**, a four Input to two Output coaxial switch module with BNC Inputs and Outputs. Twenty-eight Modules driven in parallel are needed to switch the 28 coaxial signals in a 4x2 matrix configuration. These modules can be assembled in two **GX/16-E Expansion Chassis** and controlled from one **GX/8 Control Chassis**.



The **GX Series** is used when the required number of signals to be switched exceeds that available in Standard Product such as **RS Series** Matrices and Multiplexers, which can switch up to 25 wires per crosspoint and are designed for Data Communications Signals.

For assistance in selecting the best product series and configuration for your application, please contact our Technical Sales Department at the phone number listed below.

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

GX SERIES CHASSIS

The GX Series Chassis are built as either single chassis Mainframes or as Expansion Chassis controlled by one GX Series Control Unit. For larger systems having more than 16 groups, the MESA Control Unit is used to control several GX/16 Control Units.

GX MAINFRAMES

These single chassis Mainframes are built with their own dedicated power supplies, a Control Module, and have front panel status LEDs. Available Mainframes include the GX/8 controlling 8 groups of signals or the GX/16 controlling 16 groups of signals. The number of Groups being switched by a Mainframe is limited to 16.

GX/8 MAINFRAME

This Mainframe switches up to 8 groups of signals in a 4x2 or 8x1 configuration. Each group is typically made up of one or two Switch Modules.

Example: Using **VX16/G2** Switch Modules with 32 wires per module, each switched group can handle up to 64 wires.

GX/16 MAINFRAME

This Mainframe switches up to 16 groups of signals in a 4x4, 8x2 or 16x1 configuration. Each group typically has one switch module.

Example: Using **VX16/G2** Switch Modules with 32 wires per module, each group can have up to 32 wires.

SWITCH MODULES

The following switch modules can be assembled in GX Chassis to form Group Switches:

CX SERIES are single ended, high frequency coaxial modules built as either 4x1 or 8x1 configurations. Different CX modules have different bandpass specifications and they are built with either with Type A or Type S relays as shown in the **CX Bulletin**.

Example: Switching 8 groups with 8 coaxial signals per group and needing a bandpass of 1 GHz would require eight **CXR/8x1-G Modules**.

LX SERIES are general purpose, low to medium frequency modules. One **LX8/G2 Module** can switch a group of 8 pairs, or 16 single wires, as shown in **Fig.1** of the **LX Bulletin**. The modules are built with Type S, Type M or Type LT relays.

Example: Switching 16 groups with each group consisting of four wire pairs would require eight **LX8/G2 Modules**.

VX SERIES are low to medium frequency switch modules. The **VX16/G2 Module** can switch 16 pairs, or 32 individual wires, and the **VX16/G3** can switch up to 48 wires as shown in the **VX Bulletin**. The modules are built with Type S, Type M or Type LT relays.

Example: Switching 16 groups of 48 wires each would require sixteen **VX16/G3 Modules**.

WARRANTY

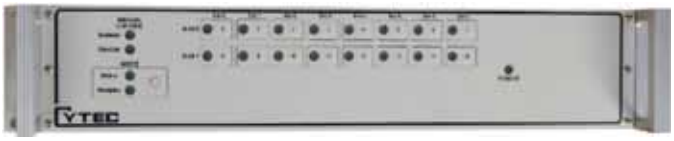
CYTEC Corp. warrants that all products are free from defects in workmanship and materials for a period of five years. Reed relays are guaranteed for 100 million operations when used within their published ratings.

GX CONTROL UNITS

One Control Unit drives several Expansion Chassis and is used for configurations requiring more than 16 switch modules. Control Units include a Control Module and the power supplies that are needed to energize a large number of Switch Modules. The following Control Units are available:

GX/8 CONTROL UNIT

This Unit controls up to 8 Groups. Each Group is typically made up of one or two switch modules and handles a large number of signals.



GX/16 Control Unit with Pushbutton Control

GX/16 CONTROL UNIT

This Unit will control up to 16 Groups, with each Group switching a large number of signals.

MESA CONTROL UNIT

When more than 16 signal Groups are required, control is achieved by using a MESA Control Unit, detailed in the **MESA Bulletin**, that drives up to 16 of the **GX/16-E Expansion Chassis** via **GX/16 Control Units**.

GX-E EXPANSION UNITS

These Units are designed for large Group Switches requiring more Switch Modules than can be assembled in one mainframe.

Up to 16 modules can be assembled in each chassis and up to 16 chassis can be controlled from the GX Control Unit, which also supplies power and controls via chassis interconnect cables.

Example: Using **VX16/G3 Switch Modules** with 48 wires per module and two **GX/8-E Expansion Chassis**, each group can switch 96 wires in a 16x1 multiplexer.

RELAY SPECIFICATIONS

	Type S	Type M	Type A	Type LT
Contact Rating VA	10	50	24	10
Switch Voltage V	200	500	24	100
Switch Current A	0.5	1.0	1.0	.25
Carry Current A	1.0	2.0	1.0	1.0
Breakdown Voltage V	400	1000	1000	400
Operating Time ms	1	2	10	1
Life Expectancy cycles	10^8	10^8	10^7	10^8

CONTACT 1-800-346-3117 OR WWW.CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE.

BULLETIN
FO(v2)

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

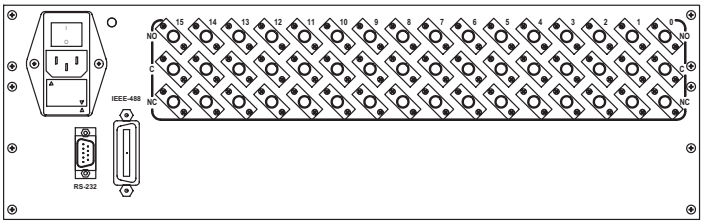
FO SERIES

PASSIVE FIBER OPTIC SWITCHING SYSTEMS

CYTEC's FO Series Passive Fiberoptic Switches are computer controlled systems designed to switch standard fiberoptic wavelengths of 850 nm, 1310 nm and 1550 nm. Multimode 62.5/125 um switches are available for 850 and 1310 nm wavelengths, while singlemode 9/125 um switches handle 1310 and 1550 nm. Passive, bi-directional, fiberoptic switches are used that show insertion losses as low as 0.10 dB for multimode and 0.25 dB for singlemode. Available configurations include individual switches and Nx1 multiplexers. Other configurations are available as semi-custom systems. Contact Cytec's sales engineers for more information. Standard controls are RS232 & IEEE488. TCP/IP Ethernet LAN, USB, and Manual Controls are optionally available.

FO CHASSIS

The FO Series are all 19" rack mounting chassis and are available either as Mainframes or Expansion Chassis. Chassis provide from 16 to 64 individual switch points. All chassis have front panel LEDs for a visual indication of switch status. Input and output signal connectors are located on the rear panel, and FC, SC or ST connectors are offered. Mainframes have built in power supplies and combined RS232/IEEE488 controls. The system is completed by specifying the type and number of FO Series Fiberoptic Switches to be installed.

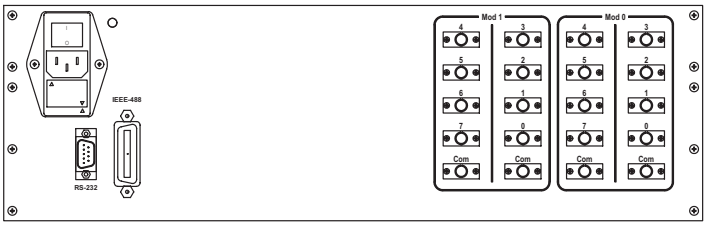


FO/16 Mainframe with 16 - 2x1 Form C Switches

FO/16 CHASSIS

Furnishes 16 individual switch points. The following configurations are standard:

- Sixteen 2x1 Failsafe Form C Switches
- Eight 2x1 Latching Form C Switches
- Two 8x1 Multiplexers
- Four 4x1 Multiplexers

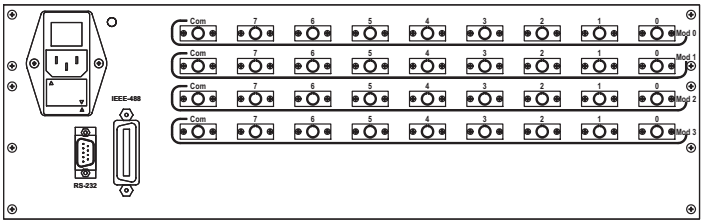


FO/16 Mainframe configured as four 1x4 multiplexers

FO/32 CHASSIS

Supplies 32 switch points in the following standard configurations:

- Thirty-two 2x1 Failsafe Form C Switches
- Sixteen 2x1 Latching Form C Switches
- Four 8x1 Multiplexers
- Eight 4x1 Multiplexers



FO/32 Mainframe configured as four 1x8 muxes

FO/64 CHASSIS

Furnishes 64 switch points. Please contact Cytec for more information.

CUSTOM CHASSIS

Available upon request. Switch modules can be wired out to nonstandard rear panel fiberoptic connectors; switch modules can also be wired together with fiberoptic interconnects to furnish small nonblocking matrices (2x2, 2x4, 4x4, etc.)

FO/16 Mainframe with Pushbutton Manual Control

FO SERIES PASSIVE SWITCH MODULES

The FO Fiber Optic Switches utilizes a “moving fiber” design concept to achieve highly accurate direct fiber to fiber connections. Currently available in **1x2, dual 1x2 and dual 1x2 nonblocking** configurations. Also available in both **Single** and **Multimode versions** as well as **Normal** and **Low Loss types.** Insertion loss is as low as 0.25 for singlemode and 0.10 dB for Multimode switches.

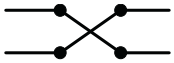
SPECIFICATIONS

(Individual Modules without connectors) :

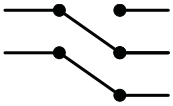
Connectors	ST, SC, FC Standard
	(others available on request)
Wavelength Range	850 nm, 1310 nm Singlemode
(nominal)	1310 nm, 1550 nm Multimode
Glass Fiber Types	9/125 um Singlemode
	62.5/125 um Multimode
Insertion Loss	0.25 dB Singlemode
Low Loss Type, typ.	0.10 dB Multimode
Insertion Loss	0.8 dB Singlemode
Normal Loss Type, typ.	0.6 dB Multimode
Back Reflection	-60 dB Typical
Crosstalk	-70 dB Maximum
Repeatablility	0.01 dB
Switch Time	10 milliseconds Typical
Optical Power	+20 dBm max. Singlemode
	+23 dBm max. Multimode

FO/1x2 Switch Module

FO/2(1x2) Blocking Switch Module



FO/2x2 Crossover Module



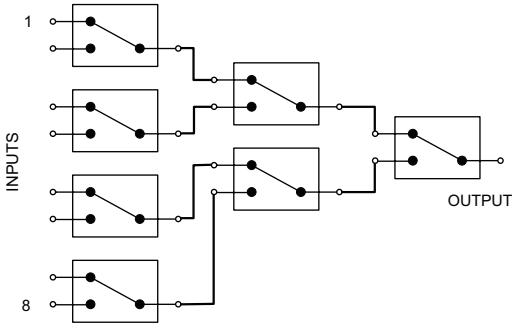
FO Series Switch Module

EXAMPLE AND DRIVER PROGRAMS

Example and Driver Programs are available for most common Windows-based programming languages, including LabView, LabWindows and Visual Basic.

FO SERIES MULTIPLEXERS

Bidirectional Nx1 Multiplexers are assembled from standard FO Chassis by interconnecting Fiberoptic Switch Modules as shown schematically below. The interconnects are fiberoptic cables and are usually wired internally. The FO/16 Chassis can be configured as four 1x4s or two 1x8s, while the FO/32 is available as eight 1x4s or four 1x8s.



8x1 Multiplexer using 7 FO/2x1 Switches

LED DISPLAYS

FO/16 and FO/32 Chassis are built with individual, discrete front panel LEDs that show switchpoint status, while the FO/64 is built with up to eight CL8 Display Modules. The LEDs are an invaluable aid in program debugging and system troubleshooting.

CONTROL MODULES

IF-5C IEEE488/RS232 COMBINED CONTROL

Installed in the FO/16 & FO/32 Mainframes. This required control module has both the IEEE488 (Talk/Listen) and the RS232 features detailed in Applications Bulletin AP-5.

IF-5 IEEE488/RS232 COMBINED CONTROL

Required in the FO/64 Mainframe. Has both the IEEE488 and RS232 features shown Bulleting AP-5.

IF-6 LAN INTERFACE

This Optional module uses TCP/IP protocols to provide control via an Ethernet LAN as described in Bulletin AP-5.

MANUAL CONTROL

SWITCH MANAGER SOFTWARE

This Control Software displays a full Graphical User Interface (GUI) and gives the operator the ability to remotely Open and Close switches as well as observe system Status.

PB/16 & PB/32 PUSHBUTTON

Individual Pushbuttons select and control switches mainframes supplying either 16 or 32 individual switchpoints.

MC/64-TW THUMBWHEEL

The FO/64 Mainframe can be equipped with with optional Thumbwheel Manual Controls.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in Materials and Workmanship for a period of 5 years and that all switches are guaranteed for their rated Operational Lifetime.

AVAILABILITY

Most systems are available 30 - 45 Days ARO.

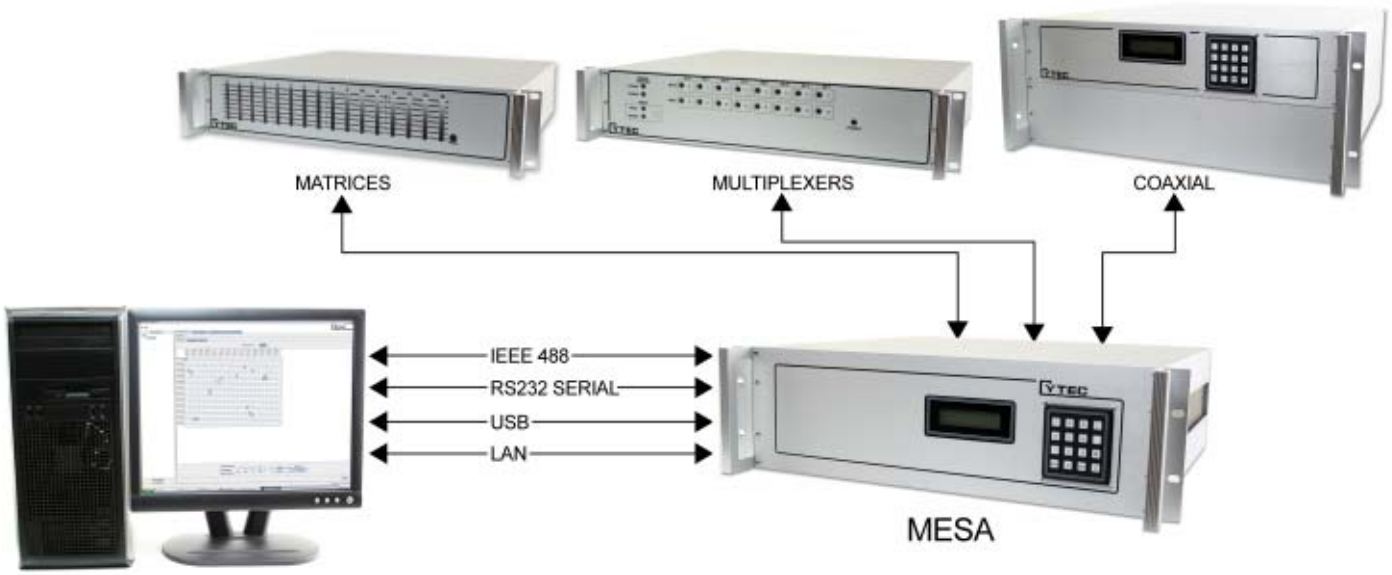
CYTEC

BULLETIN
MESA(v7)

2555 Baird Road, Penfield, New York 14526 (585) 381-4740 FAX (585) 381-0475

MESA SERIES
MATRIX EXPANSION SYSTEMS

The MESA Series Controllers make it possible to control several different CYTEC Expansion Chassis via a single control module. They are used to build large matrix or multiplexer configurations or simply run different types of expansion chassis. The MESA also reduces the costs of large systems since each chassis does not need it's own control module, and often they do not need power supplies either. Expansion Chassis can be any combination of different series types from Cytec's complete line of switching products.



MESA CONTROL CHASSIS

There are three basic Control Units: the MESA 16, the MESA 32 and the MESA II.

MESA 16 CONTROL UNIT
This Control Unit has 16 output ports to control 16 expansion chassis from one control module. The MESA 16 is 3.5" high.

MESA 32 CONTROL UNIT
This Control Chassis has 32 output ports to control 32 expansion chassis from one control module. The MESA 32 is 7" high.

MESA II CONTROL UNIT
Cytec's newest control unit, built for large digital communication systems with up to 16 chassis. It is 5.25" high.

MANUAL CONTROL OPTIONS

MC-2 has keypad selection of the switches with LCD display. **Switch Manager Software** is an interface which enables remote operators to view the status of the system and to control switch selection using a full graphical user interface.

CONTROL MODULES

The following Control Modules are available:

CM-1 TTL CONTROL
This module utilizes TTL / CMOS signals and requires 13 input bits and 1 output bit. Typically used when high speed communication is necessary. Used in MESA 16 & 32

CM-5 IEEE488/RS232
This Module has the IEEE488 Bus and RS232 Serial Control . See page **MESA-3** for details. Used in MESA 16 & 32

CM-8 CONTROL MODULE
This module has IEEE488, RS232 and Lan Interfaces. For use with the MESA II Controller only. See page 3 for more details.

IF-6 LAN INTERFACE
This module interfaces between the local area network and the RS232 Control Modules using TCP/IP commands.

MESA CONTROL UNITS

There are three basic models of the MESA Control Unit: the MESA 16, the MESA 32 and the MESA II. Each contain power supplies and an expansion motherboard. The Control Module and Expansion Interface Modules plug into the motherboard so that one Control Module can control up to 32 Expansion Chassis. The system shown in Fig. 1 has a MESA 16 Control Unit and four Expansion Chassis arranged and addressed as a 32x16 Matrix. This leaves 12 additional ports to expand the system by adding twelve Expansion Chassis.

MESA 16 CONTROL UNIT

This is a 19" rack mounting chassis, 3.5" high and 15" deep. It accepts the CM-1, CM-5 and IF-6 Control Modules and also has 16 Expansion Ports that control up to 16 Expansion Chassis as shown in Figure 1. Its power supplies output sufficient logic power to drive all Expansion Chassis and relay power to energized up to 200 relays at the same time.

MESA 32 CONTROL UNIT

This is a 19" rack mountable chassis, 7" high and 15" deep which will accept the same Control Modules as the MESA 16. It has 32 Expansion Ports to control up to 32 Expansion Chassis. Power supplies have sufficient logic power to drive all 32 Expansion Chassis and relay power to energize up to 200 relays at once.

MESA II CONTROL UNIT

The MESA II is a 19" rack mounting chassis, 5.25" high and 15" deep. It accepts one or two of the CM-8 IEEE488/RS232/ Ethernet Control Modules and also has 16 Expansion Ports that control up to 16 Expansion Chassis. It is optimized to control several large solid state expansion chassis, such as the DX/ 256x256 Series. All modules are hot swappable.

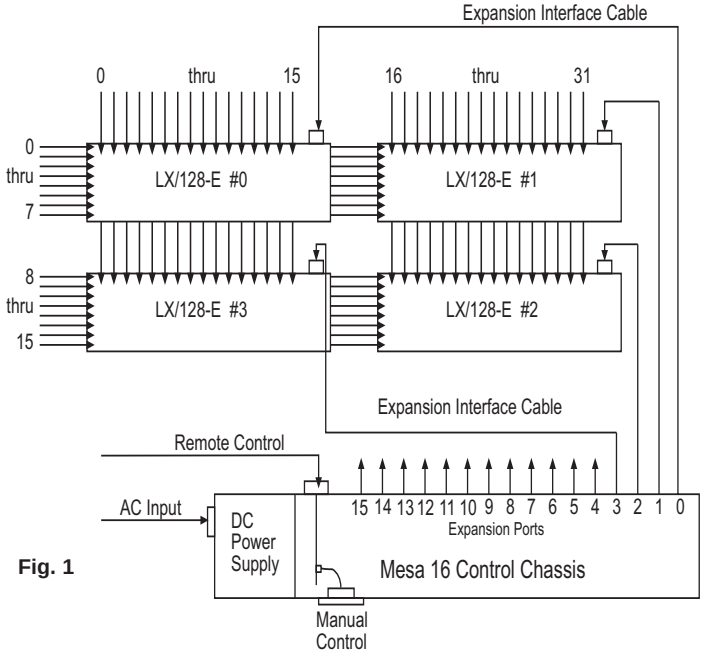


Fig. 1

MESA TO EXPANSION CHASSIS DISTANCE

Individual Expansion Chassis are normally supplied with 6 foot cables. The expansion chassis can be furnished with ribbon cables up to a length of 20 feet on request. Expansion chassis may be located up to 200 feet from the MESA if a better, shielded cable is used. To discuss these options please contact CYTEC's sales staff.

RELAY POWER REQUIREMENTS

The 12 volt relay power supplied with the MESA 16 & 32 Control Units is sufficient for most Matrix or Multiplex operations. However, some applications require a larger number of switches to be closed. For these cases, two options are offered: An Auxiliary Power Supply Chassis or Powered Expansion Chassis.

AUX-1 POWER SUPPLY

This is a separate 19" rack mounting chassis, 3.5" high and 12" deep with +5 volt logic power for up to 32 Expansion Chassis and relay power to energize up to 500 relays.

POWERED EXPANSION CHASSIS

Where the power requirement in individual Expansion Chassis is large, each Expansion Chassis can be supplied with its own dedicated relay power supply capable of energizing up to 200 relays in that chassis.

CONTROL MODULES

The Control Modules are plug compatible with the MESA control Units and utilize the same command structures for Control and Switch Selections. The commands for Mode Control are Latch, Unlatch, Matrix Mode, Mux Mode, Clear or Status Request. The standard commands for addressing a Switchpoint select an individual Matrix, Module and Switch.

Control modules are available that control the MESA 16&32 chassis via TTL, combined IEEE488/RS232, 10BaseT Ethernet LAN or USB. Standard or special firmware is installed on the modules, with the special firmware being for for some custom applications. In Matrix configurations, programming commands can address Input and Output numbers to select crosspoints, while in Multiplexer modes commands can address one Channel number to select the appropriate switch.

CM-5 IEEE488/RS232

This Module installs with the MESA 16 & 32 and combines both IEEE488 Talk Listen and RS232 Serial Controls.

IEEE488 TALK/LISTEN (GPIB)

The Talk and Listen addresses are the same and are set by a 5 position DIP Switch. In the Listen Mode, the Matrix responds to specific commands. The Talk Mode is used to return the Status of the Matrix.

Command Summary

L - Latch - a specified Module and Switch in a Matrix.
U - Unlatch - a specified Module and Switch in a Matrix.
X - Multiplex - While in MUX mode, latches a specified Switch and Clears all others.
C - Clear - Unlatches every switch and clears interface.
S - Status - The Status of all switches is returned to the Controller.
F - Front Panel - Allows the disabling/enabling of front panel controls.
P - Program - Allows the operator to set up Matrix variables such as size and configuration and stores them in nonvolatile memory.

Typical Commands Are:

Command	Function
L, n1, n2, n3	Latch Selected Switch
U, n1, n2, n3	Unlatched Selected Switch
X, n1, n2, n3	Mux Selected Switch
	n1=Matrix, n2=Module, n3=Switch
C	Clear entire system
C, n1	Clear matrix - n1=Matrix
S	Status of Entire System
S, n1	Status of Matrix - n1=Matrix
S, n1, n2, n3	Return Switch Status
	n1=Matrix, n2=Module, n3=Switch
F, n1, n2,	Front Panel Lock out
	n1=0 disable, n1=1 enable, n2=access
P, n1, n2, n3	Program setup
	n1=Parameter, n2=value, n3=access

RS232 SERIAL

The module can be configured as either a Data Terminal Equipment (DTE) or Data Communications Equipment (DCE). The Baud Rate is software programmable from 110 to 19,200 Baud and is stored in nonvolatile memory.
The Command structure is the same as the IEEE488 Module and has the following additional command features:

E - Echo - Echoes all received characters back to the source.
V - Verbose - Enables the matrix to return text strings in response to Commands, including error statements.
H - Help - This is a summary of all Commands.

RS232 Specific Commands

Command	Function
B, n1, n2	Baud Rate - n1=rate, n2=access
E, n1, n2	Echo - n1=0 off, n1=1 on, n2=access
V, n1, n2	Verbose - n1=0 off, n1=1 on, n2=access

IF-6 LAN INTERFACE

The LAN Interface accepts TCP/IP packets from a 10BaseT Ethernet Network, converts the data into RS232 format, and then transmits it to the RS232 port located on the standard CM-5 Control Module installed in the MESA. Data is also transmitted in the reverse direction; that is, RS232 data from the MESA is converted and sent over the Ethernet LAN. The command structure is the same as shown for the CM-5. In the MESA 16 & 32, the LAN must be used with the CM-5. The LAN Interface allows several users to access the MESA remotely via Ethernet TCP/IP and also via TELNET. The IF-6 is set up via an external RS232 connection that allows the user to specify IP Address, host name, gateway and many other network parameters.

CM-8 CONTROL MODULE

The CM-8 installs in the MESA II Control Chassis ONLY and has three remote control interfaces: RS232 via a D9 connetor, IEEE488 Talk/Listen and 100BaseT Ethernet via a RJ45 45 port. All interfaces can be active at the same time. As an option, two CM-8's can be installed in the MESA II, with one Control Module designated the Primary and the second designated as the Secondary controller. The control modules are also hot swappable, meaning the can be removed and then replaced without shutting down the MESA or the full switching sytem. Network parameters can be set up via any of the remote interfaces.

Control is via the same commands shown in the CM-5 Control Module section.

RAM OPTION

This option is available for the **CM-5** and **CM-8**. Switch selections are stored in the battery backup RAM (Random Access Memory) with the following benefits:

- At Power On, switches can be set to a preset default configuration.
- In cases of momentary power loss, the matrix will be reset to the last selected configuration when power returns.
- Several configurations can be stored and recalled as required, up to a maximum of 1,000 switch selections.

MANUAL CONTROL OPTIONS

Two Manual Controls are offered for the MESA: The MC-2 Keypad and the Switch Manager Software.

MC-2 KEYPAD CONTROL

This option supplies a Keypad and LCD backlit display that mounts on the MESA's front panel. The LCD Display shows two lines of 16 characters each. The top line displays entered Commands and switch selections, while the bottom line displays switch Status and Error Messages.

The MC-2 is used with the CM-5 and CM-8 Control Modules and can be installed on the MESA 16, 32, and MESA II Chassis .

CYTEC SWITCH MANAGER SOFTWARE

Using this Software, the remote operator can control and monitor the Status of any Cytec switching system via a full Graphical User Interface (GUI) installed on the controlling PC. The switching configuration is graphically displayed, and switch crosspoints are selected via point-and-click operations. Each selected crosspoint is prominently displayed.

MESA II

CYTEC MESA II Series Controllers allow the control of up to 16 separate expansion chassis from a single point of control. That is, the MESA II holds the overall system's single Control Module, and it directly controls multiple expansion chassis. The MESA II can be used to build large Matrix or Multiplexer configurations requiring multiple expansion chassis, or it can simply run several different expansion chassis.

The MESA II Switching System is composed of one primary MESA II CM-8 Control Module and up to 16 expansion chassis. It is possible to add an optional redundant/backup CM-8 .

Expansion Chassis are typically high density solid state switches, such as the DX/256x256, TX/128x128, DX/64x64 or VDX/32x32. However, the Expansion Cassis can be many combinations of product types, including but not limited to CXAR, CX, LX, HXV, VX, and PX Matrices, JX Multiplexers, GX and RS Group Switches, VDX Video Switches, FX and FO Fiber Optic Switches, HDX 4600 High Density Matrices and DX Digital Matrices. Full details on each expansion chassis type are given in their respective bulletins, which can be viewed in the full product catalog or downloaded from www.cytec-ate.com.

Standard computer control is via IEEE488, RS232 and Ethernet TCP/IP, and Keypad Manual Control can be supplied as an option.

EXPANSION CHASSIS

The versatility of the MESA Controller is that it enables up to 32 Expansion Chassis of different types to be controlled from one Control Unit. This means that it is possible to build a complete Switching System including Matrices, Multiplexers, Group Switches or Individual Relays by selecting the Expansion Chassis and Switch Modules most suitable for the application.

Each Expansion Chassis can be used for handling different types of signals including: Low Level Instrumentation, RF Coaxial, Audio, Video, High Voltage or High Current. The Expansion Chassis can be located remotely from the Control Unit so that each chassis can be placed close to the signal source, reducing connecting wiring length with improvement in signal transmission.

The Expansion Chassis can be used in any combination with the MESA Control Unit. Full details on each type of Chassis are described in their respective bulletins which are part of the CYTEC catalog and can also be viewed at www.cytec-ate.com.

CYTEC SWITCH MANAGER SOFTWARE

The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager free of charge from our website.

Available for Windows, Linux, Mac OS, or any other Java enabled platform

SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

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INTERFACE BULLETIN AP-5

QUICK GUIDE - Call or E-mail for complete manuals.

Mainframe Control Modules

IF-5, IF-5C -- IEEE488 / RS232 Combination.

IF-9 -- 100BaseT Ethernet LAN/RS232 Combination.

IF-6 -- 10BaseT to RS232 converter used in conjunction with IF-5 controls to give all three possible interfaces or combinations of GPIB and LAN. Can be added externally to existing units.

IF-7 -- USB to RS232 adapter. Inexpensive way to update legacy RS232 systems to USB ports.

IF-1 -- TTL Control Module - 13 bits of input and 1 bit of output. Lo true logic with D25 connector.

Mesa Control Modules (Large systems)

CM-5 -- IEEE488 / RS232 Combination.

CM-8 -- 100BaseT Ethernet LAN/RS232/GPIB Combination.

IF-6 -- 10BaseT to RS232 converter used in conjunction with CM-5 control to give all three possible interfaces or combinations of GPIB and LAN. Can be added externally to existing units.

IF-7 -- USB to RS232 adapter. Inexpensive way to update legacy RS232 systems to USB ports.

CM-1 -- TTL Control Module - 13 bits of input and 1 bit of output. Lo true logic with D25 connector.

All Cytec systems and interfaces speak the same language and use the same simplistic command set. There are additional commands for more complicated systems that you may or may not make use of but the basic syntax is the same for every system we have ever made over 32 years. It's just a switch, we try to keep it simple.

All Cytec commands consist of an alpha character or characters followed by two or three integers. The alpha character is the command and the integers are the programmatic address of the relay. If you have a single chassis Mainframe the two integers are the module # followed by the relay or switch #. If you have a matrix configuration such as a 16x8 configuration the integers will typically correspond to an input or output number.

Commands:

L = Latch = Close Relay or turn ON relay.
U = Unlatch = Open Relay or turn OFF relay.
C = Clear = open all relays or turn OFF all relays
S = Status which can be used on individual switch points, modules, or the entire system.
The S command returns a 1 for on (Latched) and a 0 for OFF (Unlatched)

ex:

The command	L3 5	translates to Latch Module #3, Relay # 5 or turn on relay #5 on module #3.	
The command	U7 14	translates to Unlatch Module #7, Relay #14 or turn off relay 14 on mod 7.	
The command	S4	returns	00100000 Where module 4 has 8 relays.
	which translates to "the third relay on Module #4 is ON, all others are OFF.		

If the system has multiple chassis you simply add the chassis # as the leading integer, i.e:

L3 10 25 = Latch Chassis #3, Module #10, Relay #25 or Turn on relay 25 on module 10 in chassis 3.

See next page for a guide on which one to chose.

CONTACT 1-800-346-3117 OR CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE

A guide to communicating with programmable switches

CYTEC Switching Systems are available with a variety of communication interfaces. Which one is right for your application is dependent on what you are trying to accomplish. This bulletin lists the options and reasons for choosing them. Since switching systems are often used in conjunction with other, more complicated devices your choice may be dictated by those needs and all you need to know is that we support that option. Cytec supports all of the following interface choices:

- **IEEE488** -- Commonly referred to as GPIB (General Purpose Interface Bus). This was the industry standard for test instruments for 40 years and is still widely used and very popular. It is fast, can be daisy chained between devices and is supported by most software. Requires knowledge of BUS language and hardware. Very popular for use with graphical programming languages such as National Instruments LABView. Cytec supports the only two 488.2 (SCPI) commands needed for switching which are *RST (reset) and *IDN (ID).
- **RS232 Serial** -- The standard COM port on PC's until USB began replacing them in the 90's, it is still used due to entrenched legacy support, inexpensive price and software support. Very inexpensive USB to RS232 converter cables still make it a viable option. Major drawback is speed limitations and one-to-one connection which means you need a separate COM port for every device.
- **Ethernet LAN** -- Taking over as the predominate interface choice. 100BaseT or Gigabit Interfaces have the needed speed for many applications and allows access from anywhere which opens up opportunities for remote access. Number of devices controlled from one computer is almost unlimited. Drawbacks are dependent on Network Infrastructure and you may need to involve IT department to do everything you want to do.
- **USB** -- Quick, easy solution for small systems if the device is provided with software or drivers. Becomes increasingly complicated with multiple devices and cables are length limited so demand has been low.
- **TTL** -- Still the best choice if all you want is fast, uninterrupted control. Dependent on understanding of TTL output device used (there are many and they are all different) so typically more difficult to program.

Common Questions:

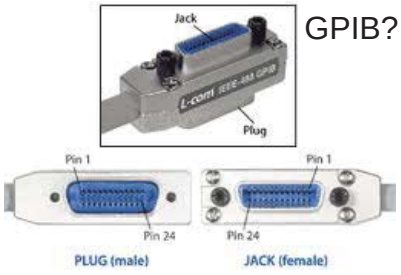
Q What help is available?
A Quite a lot. Cytec provides programming support on a variety of levels for most common languages and compilers. Example code, GUI drivers and freeware programs are available on the support page of our website at cytec-ate.com/support or just call or e-mail. We're always here to help you out.

Q Do you support third party languages like National Instruments LabView or Matlab?
A Yes. See our support page or e-mail us and we'll send you whatever you need.

Q Do you support Operating systems other than Windows?
A Yes. Since our devices are simply controlled by sending them ASCII test strings they are basically OS independent. If you have a specific question about MAC, LINUX, or any other OS we can get you the answers you need.

Q What is LXI and do you support it?
A LXI is an industry supported common framework for test instruments connected to a LAN. Cytec's LAN interface is so simplistic that the LXI interface only adds a layer of unneeded complexity. The useful parts of LXI can be set-up on Cytec equipment via Telnet in less time than it would take to explain it. So basically we support LXI but have not joined the consortium or added the extra layer. We like things simple.

CONTACT 1-800-346-3117 OR CYTEC-ATE.COM FOR TECHNICAL ASSISTANCE.



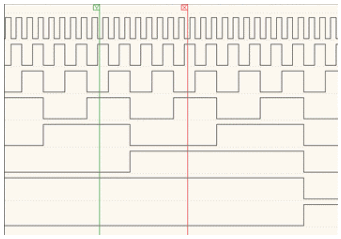
GPIB?

Ethernet?

RS232?

USB?

TTL?



Which should I choose?

We always feel the best choice is to use what you know. If you are set-up for GPIB and already are familiar with the interface it's the logical choice. If you're starting from scratch and haven't written software yet you should base the decision on the requirements. The guide below provides answers to commonly asked questions:

Requirement	
Speed	Usually a requirement of automated test apps. GPIB, TTL or possibly Ethernet. Keep in mind that mechanical relay based switching systems operate slowly from an electrical point of view. Typically relays take 1 to 10 ms to open or close and even solid state switches with ns switch times may require settling times greater than 10 ms for realistic measurements. Ethernet can be fast on a closed network but can have latencies on a WAN. The absolute fastest interface is TTL followed by GPIB and then typically Ethernet.
Price	Every computer has an RS232, USB or ethernet port built in so any of these options work. Which of these works best for you would be a function of what software you intend to program with and which interface you understand. GPIB and TTL will require additional hardware for your computer if you don't already own them and may require software that typically isn't given away.
Remote access	Ethernet shines here. How remote you can be depends on your network. If you have complete network control you may be able to get to the switch from anywhere in the world. If you do not have control you will need to involve someone in the IT department that can tell you what is possible on your network.
System size and physical layout	If you have a single stand alone chassis and aren't talking to a bunch of different devices then RS232 or a USB to RS232 adaptor works fine. If your going to rack and stack a lot of equipment then lean towards GPIB or Ethernet or for our equipment look at Mesa Controller which allows one control port to drive multiple chassis. If you are going to locate switches a long way apart from each other then ethernet is the obvious choice. If you have a lot of switches but only need to spread them out between multiple racks then a Mesa Controller will allow control of multiple chassis up to 30 feet apart.
Ease of use	Once again this depends on how familiar you are with the standard interfaces and what software you want to use. We offer basic mouse-click software that works with Ethernet, GPIB and RS232 and you can always use Telnet or command line prompts to do simple manual control. If you have a complex project ahead of you then there are software companies that make programs for controlling this kind of equipment. There will be a learning curve involved but they are getting easier every year.

For Tech Support or Software Help: 1-800-346-3117 or 1-585-381-4740
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